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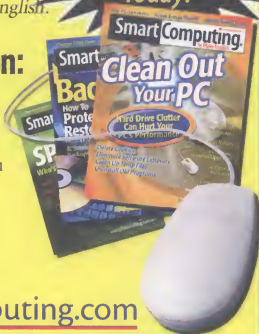
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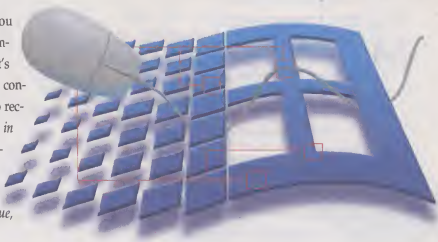


Troubleshooting Windows

Smart Computing Learning Series
Volume 8 Issue 6

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In this issue, we give you the ammunition you need to win the war against operating system-related gaffes, glitches, and gotchas. Whether it's a system slowdown, an uncooperative Internet connection, or a new device that your PC refuses to recognize, we can help. (NOTE: If you're interested in troubleshooting problems with specific devices [printers, monitors, PDAs, etc.] or applications [such as Word, Windows Media Player, Excel, WordPerfect and others], you'll want to check out our next issue, which will cover troubleshooting PCs and software.)



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Play Detective

Track Your Problem Down



It was a dark and stormy night. Well, maybe not, but it was definitely the beginning of a mystery. The last time you saw your PC, it was healthy. You thought it would always run like a top, but now it sits motionless and silent on your desk. This is where the story begins. It's the mystery of what happened to your PC, and it's time to hunt down the culprit. What did this do to your computer? Can you stop it from striking again? In this issue, we'll discuss many different types of problems you may encounter with Windows 9x/Me/XP and we'll run down some solutions. (We'll cover application and hardware-related problems in an upcoming issue.)

■ It's Elementary, My Dear Watson.

Following some general troubleshooting guidelines will help you organize your investigation and avoid unnecessary efforts. You probably know a bit about logical troubleshooting from problems in your day-to-day life. As an example, let's say you get in your car one morning. As you pull out of the driveway, you notice a strange clunking noise. You feel the car bump and jostle as you drive down the street. Immediately, you imagine all the things that might be wrong. Perhaps you waited too long for your last oil change. Maybe your engine's dying. Maybe your whole car is about to spontaneously combust. Worried, you

pull over to the side of the road, get out of the car, and notice that you have a flat tire. Ah, that explains the rough ride and the clunking noise. Can you imagine if you'd assumed an engine problem, popped the hood, dismantled the engine, and bought several expensive parts before realizing that the only problem was a flat tire?

When something goes wrong with a PC, many people immediately assume the cause is something very complex and technical. Well, the cause may indeed be complicated, but just as finding the flat tire on your car saved you time and money, starting with the simplest explanation for your PC's woes may save you troubleshooting hours and technical-support calls. A calm, reasoned, methodical approach to problem-solving helps you eliminate some explanations and focus your attention on the likely cause of your computer troubles.

Thus, when troubleshooting, start with anything that's easy to check and to correct. For instance, if you can't print, begin by checking the power cord and your parallel or USB (Universal Serial Bus) cable. Make sure they are all plugged in securely. Next, check anything that you can check quickly but that might take some effort to remedy. In the printer example, you could try to print a document in another application. That's easy to check and will tell you whether a specific software application was the root of the problem. You

may need to do further investigating at this point, however. After you've checked any obvious, easily accessible signs of what might be wrong, examine the symptoms and hypothesize about what might cause those symptoms. If you classify your printing problem as either a Windows, software, printer driver, or hardware issue, you can methodically examine and rule out each possibility. (For more detailed printer-related troubleshooting tips, see "Crack Your Printer Predicaments," beginning on page 86). It's easier to research possible causes once you know which component is the probable cause of the problem. When in doubt, remember the rule of simplicity: Start by examining the simplest explanation and progress gradually to more complex possibilities.

■ **Conflict Avoidance.** Once you've learned to emphasize simplicity, you'll probably gain an appreciation for the most basic troubleshooting concept of all: Take precautions and maintain your system. After all, what could be simpler than avoiding a problem in the first place? Some basic maintenance can drastically reduce the number of Windows problems you troubleshoot in the future.

Many of us learned early in life that it's bad to avoid problems, and that we should take difficulties as they come and deal with them head on. What's an admirable, assertive trait in human-to-human interactions, however, isn't necessarily good for human-to-computer interactions. No one will think less of you if you avoid confrontations with viruses, worms, and Trojan horses by using a virus scan utility (see "Something Wicked This Way Comes," beginning on page 12, and "Remote Tech Support," beginning on page 28). Although avoiding problems with other humans might indicate that you're passive-aggressive, it's nothing short of assertive to avoid computer problems by defragging your hard drive or deleting TMP files (see "Keep It Shipshape," beginning on page 9).

You should also stay on top of any software patches or updates, including the release of new drivers for your peripherals (see "Patch Promptly," beginning on page 15). Many users don't realize that outdated software leads to many application conflicts and other related problems. Newer versions may not only correct bugs but also add new features.

Even when you know you should attack potential problems before they occur, it can still be easy to forget to perform scheduled

maintenance tasks on your PC. That is, it's easy to forget until something goes wrong. The Windows Maintenance Wizard can help you stay on top of the tasks that keep your system up and running (see "We're Off To Use The Wizard," beginning on page 7).

Of course, even if you take these proactive measures, you'll still occasionally run into problems. In this issue, we'll take a look at some problems and possible solutions for common Windows-related errors.

■ A Dragnet For Internet Problems.

Many of the computer problems people encounter involve the Internet. There are many variables, some on the user's end and some on the server's end. Let's say Mike wakes up one morning and tries to check his e-mail. He gets an error message stating that his PC can't connect to the Internet. If Mike follows the rule of simplicity, he'll start by checking things such as whether the modem is turned on and plugged in. There's no sense in checking his dial-up settings or calling his ISP's (Internet service provider's) help line if his son unplugged the modem.

Perhaps Mike's modem dials his ISP's number but fails to connect. This may be due to a slow connection, a changed ISP phone number, or several other causes (see "From Point A To Point B," beginning on page 34 and "No Connection," beginning on page 36). Even if Mike has a DSL (Digital Subscriber Line) connection or cable modem, he may experience slow connections. Mike will find that there are ways to troubleshoot these problems as well (see "Bandwidth Bromides," beginning on page 51). If Mike finally makes a connection but still can't check his e-mail, he'll have to methodically determine the culprit: his modem, his password entry, his Outlook Express settings, or other user settings (see "One Day It Works, The Next It Doesn't," beginning on page 38).

■ **Multimedia Migraines.** With so many online music sites, a plethora of games, and a number of audio and video functions, your PC has many opportunities to stumble when it performs multimedia tasks. If your multimedia functions don't work, you're likely to feel a pounding headache rather than hear a pounding, musical drumbeat. If you have problems with your sound, check out "Without A Sound," beginning on page 54; "No Tunes," beginning on page 56; and "Media: MIA," beginning on page 61.

Gaming and DVD viewing are two other popular multimedia activities. If you have problems playing games on your PC, you'll want to read "Game Over . . . Or Is It?" beginning on page 57. Now that more PCs come with a DVD drive, more tech support calls are related to DVD problems. Because DVDs are a relatively new technology, you may not be



Do simple checks before you start any extensive troubleshooting. For instance, make sure your monitor cable is attached securely before examining your Windows monitor settings or calling a tech support line.



There are many reasons a USB (Universal Serial Bus) device may not work properly. For example, some devices don't support add-on USB boards, such as the one pictured above.

familiar yet with some of the things that may go wrong when you try to play a DVD. For a detailed rundown of DVD problems and solutions, see "DVD Difficulties," beginning on page 64.

■ Peripheral Problems Aren't Really

Peripheral. If you think about the number of peripherals attached to your computer, you'll realize that there are many opportunities for something to go wrong. If a new peripheral device, such as a mouse, digital camera, monitor, or printer, doesn't work, you'll get to put

your troubleshooting skills to the test (see "Device Problems," beginning on page 68). These days, many peripherals come with a USB interface, so learning about USB problems (see "Kicked Off The Bus," beginning on page 76) will help you fix many peripheral errors.

Different peripherals have their own set of troubleshooting guidelines. For monitor problems, see "Fight Flicker," beginning on page 79 and "Less Than CinemaScope," beginning on page 81. You may also experience problems with your keyboard (see "Keyboard Crises," beginning on page 84) or mouse (see "R.I.P. Rodent," beginning on page 89).

■ **All The Rest.** In the last section, "General System Issues," we'll cover many of the typical system problems you may run into, including losing files, startup and shutdown difficulties, and systems that are slow or that crash frequently (see "System Slowdowns," beginning on page 100, and "System Crashes," beginning on page 103).

To learn more about those sometimes cryptic error messages, see "Decipher & Solve Error Mysteries," beginning on page 120. Understanding error messages is a great way to narrow your search for the culprit behind PC woes, and knowing the error messages also helps you communicate information if you need to call a tech support line.

■ **Seek Professional Help.** Sometimes, despite your best efforts to prevent Windows problems, something will go wrong, and you'll need technical assistance. If you've made a tech support call before, you may know that your mileage varies. In other words, sometimes the support staff gets right to the source of your problem, and your computer's working in no time. On other occasions, it seems the tech support staff is little help at all. Just as you can improve the mileage in your car by changing your driving habits, you can improve your tech support/mileage by keeping a detailed record of your computer's symptoms (see "The Tech Support Mambo," beginning on page 22, and "Free Tech Support," beginning on page 25). If you're using a paid technical support line, such as Microsoft's, you'll definitely appreciate these tips because they may help the support technician quickly resolve your computer problems. [E]

by Kylee Dickey

We're Off To Use The Wizard

The Maintenance Wizard & Scheduled Task Wizard Simplify Regular System Upkeep



The best way to fix problems with your PC is to prevent them from happening in the first place. Fortunately, all versions of Windows come equipped with several tools designed to keep your system in tip-top condition. For example, ScanDisk cleans the storage drives of errors that lead to file corruption and drive crashes, while Disk Defragmenter organizes data on the hard drive for optimum performance. The only trick is remembering to run these utilities and perform other basic system maintenance tasks on a regular basis. That's where the Maintenance Wizard and Scheduled Task Wizard come in.

■ **A Wizard's Toolbelt.** The Maintenance Wizard is a Windows 98 and Windows Me

utility that essentially manages the operation of the primary system maintenance tasks. These tasks include scanning for drive errors, deleting unwanted and unnecessary files, and disk defragmentation (the process of arranging related pieces of data on a drive so the computer can access them quickly and efficiently). Maintenance Wizard comes bundled with Win98 and WinMe. It is not an option in Windows XP.

You can access the Maintenance Wizard by opening the Start menu, burrowing through the Programs, Accessories, and System Tools folders, and selecting the Maintenance Wizard option. The first time you open the wizard, you have to configure it to match your schedule and needs. Start by opting for an Express

or Custom configuration. We suggest choosing the Custom configuration, as it lets you specify when and how often the Maintenance Wizard should perform each maintenance routine. The Express configuration, on the other hand, simply sets the wizard to a default configuration that may or may not fit into your schedule.

Next, you can indicate when you want the Maintenance Wizard to perform its maintenance tasks. You have three default options: nights from midnight to 3 a.m., days from noon to 3 p.m., and evenings from 8 p.m. to 11 p.m. You also can customize the settings. Again, we suggest that you select the custom option because this lets you arrange the maintenance tasks around your schedule rather than rearranging your schedule around the maintenance tasks. Click the Next button to continue.

The following screen presents a list of the programs that launch automatically whenever you turn on your computer. These programs, which usually appear as miniature icons in the System Tray, extend the time it takes for Windows to start. The Maintenance Wizard lets you maximize startup efficiency by turning these programs off. All you have to do is deselect the program from the list (click to remove its check mark). You can add them again later by returning to the Maintenance Wizard and selecting the desired program (by placing a check mark next to it). Click the Next button to proceed.

The next three screens let you specify whether, when, and how often you want to perform disk defragmentation, scan for drive errors, and delete unwanted programs. Each screen gives you the option of choosing to perform the task. Select the No option if you don't want to add the task to your maintenance routine. Select the Yes option if you do.

If you decide in the affirmative, click the Reschedule button to access the scheduling dialog box. In this dialog box, you can choose the time and day to perform the maintenance task, as well as the frequency (daily, weekly, monthly, etc.) with which to perform it. Click the OK button to save your schedule and return to the Maintenance Wizard, and then click the Settings button to configure how you want your system to perform each task. You can specify which drives your system defragments, for instance, or which type of extraneous files your system deletes. Click the OK button in each of these Settings dialog boxes to save your changes and return to the Maintenance Wizard. Click the Next button to proceed through the tasks.

Finally, the Maintenance Wizard presents a list of the maintenance tasks on your schedule. Review the list and click OK to save your maintenance schedule. If you want the wizard to launch the maintenance tasks immediately, select the When I Click Finish, Perform Each Scheduled Task For The First Time option before clicking the Finish button.

■ **Stick To The Schedule.** Microsoft may have stripped WinXP of the Maintenance Wizard, but the company didn't take away your ability to create an automated schedule of maintenance tasks. The Scheduled Task Wizard (also referred to as Task Scheduler), a mainstay of Windows since the release of Win98, can help you establish an itinerary for running common maintenance procedures on your system.

To access the Scheduled Task Wizard in WinXP, open the Start menu and select the All Programs link (users of Win98 and WinMe should open the Programs folder instead). Burrow through the Accessories and System Tools folders until you locate Scheduled Tasks. Click this option to open the Scheduled Tasks control panel. Once inside, double-click the Add Scheduled Task icon. The Scheduled Task Wizard will appear on-screen immediately. Click its Next button to start the process of scheduling a maintenance task.

The first step asks you to select the relevant program from the list provided. The only maintenance utility on this list in WinXP is Disk Cleanup (Win98 and WinMe also list ScanDisk and Disk Defragmenter). You can select the other maintenance routines by clicking the Browse button and looking inside the C:\WINDOWS\SYSTEM32 folder for Dfrg.exe (Disk Defragmenter) and Chkdsk.exe (Checkdisk, which is the equivalent of ScanDisk in WinXP). After selecting one of these options, click the Next or Open button, whichever is relevant.

The following screens ask you to provide a name for the task and indicate how often you want to run it, the time and day you want to run it, and your system username and password (if necessary).

Finally, the Scheduled Task Wizard will ask you to verify the terms of the task. Make sure the time and frequency are correct, and then click the Finish button. If you select the Open Advanced Properties For This Task When I Click Finish option before clicking the Finish button, a dialog box with advanced configuration options will appear on-screen. Set the advanced properties, which differ for each utility, and click OK to save your changes.

The new task should appear in the Scheduled Tasks control panel, directly beneath the Add Scheduled Tasks icon. If it doesn't, open the View menu and select Refresh. You can add as many scheduled tasks as you want, including running antivirus and backup utilities.

■ **Troubleshoot Maintenance.** Unfortunately, careful maintenance as provided by the Maintenance Wizard and Scheduled Task Wizard does not equate with trouble-free maintenance. Without scrupulous oversight on your part, your system maintenance schedule will eventually hit a snag that puts your system at risk. You can minimize the likelihood of such problems by heeding a little preventative advice.

Keep your computer on. The problem with maintenance utilities is that you can't run them effectively while you're using the computer. Consequently, many computer users set the Maintenance Wizard and Task Scheduler to

Reset power management settings. Windows Power Options may shave a few bucks off your electric bill, but we recommend disabling all power-saving settings on your PC if you want to get optimum performance, especially in the area of system maintenance. The power management settings can interrupt your maintenance utilities or prevent them from running in the first place. If you really want to save power, buy energy-efficient computers and monitors that bear the Energy Star label (and most do).

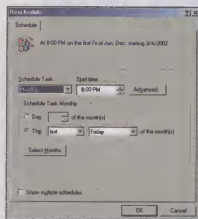
To disable your power management settings, open the Control Panel and double-click the Power Options icon (it's called Power Management in Win98). On the Power Schemes tab of the resulting dialog box, make sure the Turn Off Monitor, Turn Off Hard Disk, and System Stand By fields are set to Never. Click OK to save your changes.

Set the clock. The Maintenance Wizard and Scheduled Task Wizard operate according to your system clock, not your wristwatch or Greenwich Mean Time or some other external timekeeper. As a result, you must make sure your system clock is set to the correct date and time. To do so, open the Control Panel and double-click the Date/Time icon. In the resulting dialog box, make sure the date and time are set correctly.

Update maintenance settings as needed. You can prevent problems from striking your maintenance schedule if you update the Maintenance Wizard and Scheduled Task Wizard as needed. Both utilities make it easy to do so. For example, any time you access the Maintenance Wizard after the initial configuration, it will give you the option of changing the maintenance settings.

Similarly, you can alter a scheduled task by opening the Task Scheduler and double-clicking an item. On the Schedule and Settings tabs of the resulting dialog box, you have the opportunity to change the task parameters. You also can pause the Task Scheduler or stop it from running by opening its Advanced menu and selecting its Stop Using Task Scheduler or Pause Task Scheduler options.

■ **In Top Condition.** By handling the drudgery of system maintenance for you, the Maintenance Wizard and Scheduled Task Wizard keep your PC in prime condition and help you avoid the problems that arise from everyday wear and tear. It doesn't take a wizard to see the value of that. **[E]**



The Maintenance Wizard oversees the performance of ScanDisk, Disk Defragmenter, and Disk Cleanup. All you need to do is specify when and how often you want each utility to run.

launch the utilities in the middle of the night when no one is using the PC. Such a strategy works well as long as the user leaves the computer on and running overnight. But if the computer is turned off at the end of the workday ... well, those maintenance tasks go undone.

One solution is to set all of the maintenance utilities to run at different times on the same night. That way you only have to remember to leave the computer running one night of the week. Another option if you have a regular daily routine is to set a different utility to run during your lunch hour each day. That way you can get the tasks performed without leaving your computer running all night.

by Jeff Dadd

Keep It Shipshape

Avoid Problems Through Regular Upkeep

Computers have come a long way since the days when finicky, temperamental, one-of-a-kind devices filled researchers' laboratories. Today's personal computer is rugged, able to withstand a great deal of abuse and neglect and still keep on chugging. However, like any other machine, it can and eventually will break down unless you provide it with the care and attention it requires. But never fear, the days of needing a licensed computer geek to tend to your computer are long gone. Most of the routine maintenance tasks we'll show you are easy and inexpensive and will have a dramatic effect on your computer's longevity.

Find An Appropriate Place For Your Computer.

Although computers have become more and more like household appliances, they still have their own special environmental needs. Most importantly, you need to keep your system cool and clean and avoid physically abusing the machine. Addressing these issues now will ensure that you can concentrate on actually using your computer instead of repairing or replacing it.

Cool means cool. Your computer can operate in a wide range of temperatures without too much immediate trouble. However, there are limits to what it will withstand for long periods of time. You may not notice any immediate performance degradation, but over time your computer's components will have to work harder and will thus wear out more quickly. The best rule of thumb is that your computer should be in a room in which you would be comfortable. If you have an attic office that reaches 100 degrees in the summer, it might be wise to invest in an air conditioning unit for your computer's sake, if not your own. The converse isn't necessarily true, as computers enjoy cool temperatures. A room

kept at 50 degrees wouldn't cause any harm, though you should try to maintain a consistent temperature where you keep your computer. When electronic components experience dramatic changes in temperature, the fatigue and stress on components is the cause for failure down the road.



The eternal debate. A long-running discussion has raged in the computer industry regarding the pros and cons of shutting down your system when it isn't in use. On the one side, many feel that leaving a computer running simply wears down its components unnecessarily. The other side points out that powering these same components on and off repeatedly causes more long-term damage than simply running your system continuously. The components in your computer experience the greatest amount of trauma during the computer's startup sequence. It's your call, but our recommendation is that if you can afford the electricity, leave your computer running.

In contrast to your computer, your monitor is designed to be shut down daily, so feel free to turn your monitor off whenever it isn't in

use. Monitors also generate a great deal of waste heat, so turning them off will also lower your power bill.

Humidity. Your computer is fairly tolerant of high humidity, but don't push your luck. If continuously exposed to a humid environment, your components will begin to corrode. If you live in a coastal region, be aware that the high salt content in your breezes can speed up this corrosion process. A room dehumidifier may be a worthwhile investment if you face situations like this.

■ **How Clean Is Clean?** If you ever get the opportunity to visit a chip fabrication plant

where computer CPUs are manufactured, you might be amazed at the lengths to which plants go in providing immaculate production facilities. Called "clean rooms," these facilities treat chip fabrication with the sort of care normally associated with germ warfare labs. Do you need to have the same sort of cleanliness? Not really, although your computer wouldn't complain.

Dust in the wind. Your computer's biggest enemy is dust. Dust, dust bunnies, dirt gremlins, and hairballs all pose a threat to your computer. Many people place their computer on the floor, to maximize desk space. Although your situation may require this, keep in mind the consequences. Today's computers employ a large number of cooling fans that continuously pump air through your computer's chassis. Combine this

with a dirty floor, shedding pets, and miscellaneous debris, and you have a computer that acts like an expensive vacuum cleaner. Keep the area around your computer as free as possible of dust and lint, put the cat outside, and leave the vacuuming to your Hoover.

Food for thought. Attitudes toward computers have shifted from thinking about them as eccentric gadgets to considering them everyday appliances. Because of that, you may not be concerned about eating around your personal computer. Usually this won't cause tremendous problems, but if you aren't careful, you may find yourself in a sticky situation. Food has a habit of ending up in your keyboard, in your mouse, and in the worst cases, in your computer chassis. If you absolutely, positively can't keep the food out of your work

area, be sure to follow the cleaning tips below. One area that deserves special caution is any type of beverage or other liquid. Although a keyboard can be cleaned, spilling a soda into your computer case is a sure way to damage your computer.

■ **It's The Hard-Knock Life.** You use your computer for games, e-mail, education, and managing your finances. Your computer is adept at this myriad array of tasks, but one thing it can't handle well is physical abuse. In addition to any cosmetic damage, the internal components can be broken or disrupted. If you can manage it, try and place your computer case where it won't be kicked or knocked over easily.

Notebooks. With notebook and other portable computers, this problem is magnified dramatically. Though OEMs (original equipment manufacturers) try to make notebook computers as rugged as possible, they are still relatively fragile pieces of equipment. A notebook's LCD (liquid-crystal display) is its most sensitive component and not easily replaced if damaged. The best way to protect a notebook is to use a sturdy, well-cushioned carrying case. Although a snazzy leather case may make you the envy of your friends and co-workers, it won't do much good if you drop your notebook. For years, photographers have relied on ZERO Halliburton (<http://www.zerohalliburton.com>) cases to protect their camera gear, and these are an excellent choice for notebooks as well.

Special environments. If you use your computer in an unusual location such as a workshop, mechanic's garage, or any place where your computer may face a high risk of abuse, investigate whether a protective enclosure would be worth the cost. The price for these enclosures depends upon the size of your computer, but they do add valuable protection. Additional bracing can protect your computer from toppling over in a workplace. One reputable vendor for this sort of hardware is Black Box Network Services (<http://www.blackbox.com>).

■ **Spring Cleaning.** Routine preventative maintenance can spell the difference between a



Most computers rely on a fan, often more than one, to keep their electronic components cool.



Compressed air helps you clean hard-to-reach areas.

reliable computer system and one that is prone to irritating and hard-to-diagnose problems. Just as tuning up your engine, rotating the tires, and changing the oil are necessary aspects of car ownership, so are the physical and OS (operating system)-specific tasks we'll guide you through. They may not be fun, and they'll take some of your time and patience, but you'll thank us in the end.

Most desktop computer systems consist of a monitor, keyboard, mouse or pointing device, and the computer case. Notebook computers combine all these components, but the maintenance tasks are generally the same. Remember all the problems posed by your computer's environment? Now is when you deal with the effects posed by a less than ideal environment.

Dump the dust. Dust is the enemy of all that is good in computing. Dust clogs air vents in your computer case, diminishes the ability of your fans to cool your system, gets into your CD-ROM and floppy drive, and finally, makes

the inside of your computer look like an attic in an old house. Luckily, dust is one of the easiest problems to address during spring cleaning. Using a can of compressed air and a vacuum with a wand attachment, cleaning your computer is a snap.

1 First, shut down your computer, unplug any power cords to avoid electric shock, and open your case. Most cases today have "tool-less" chassis that use knurled screws to hold the panel in place. Make sure you don't misplace these parts as you disassemble the case. (And just to be extra safe, we'll repeat: *Unplug the power cords before messing around inside the case.*)

2 With your case exposed, either place it on an antistatic mat or use an antistatic grounding strip to protect the computer's components. Static discharge can easily ruin your computer's internals.

3 Looking inside, you'll see three main components: the motherboard, the power supply, and your storage devices. There will also be some small fans that will need our attention, as well as a bevy of cables connecting all the components.

4 Before you begin blasting everything in sight with compressed air, take a moment and pick your targets. The main priority in this task is similar to the physician's credo, "Do no harm." Removing all the dust and debris is our goal; damaging your computer is a bit counterproductive.

5 Gently blow compressed air into your computer case, using the wand that comes with the can. The wand will help you direct the airflow with precision. You'll be surprised at how much dust accumulates over time.

6 If your computer is hip-deep in dust balls, use your vacuum's wand attachment to gently remove the offending items. Be cautious about applying too much suction to components, as you might inadvertently dislodge something.

Food. Like dust, food has an uncanny ability to infiltrate your computer. Whether it's the

crumbs of a snack you just finished or dribbles of soda that mar your monitor and keyboard, now is the time to put a little elbow grease into cleaning your computer.

1 Most keyboards are pretty forgiving, but don't tempt fate. After you clean your computer case with compressed air, blow out your keyboard. The easiest way is to simply start at one end and work your way to the other. This should dislodge most crumbs, as well as removing our arch foe, dust.

2 If you have stains from beverages, wiping your keyboard with a cloth dampened with window cleaner will usually do the trick. Most of today's keyboards let you pop an individual key out of the keyboard if necessary. Make sure that your system is shut down when you do this.

3 Cleaning your monitor is easy. Using a clean cloth and window cleaner, you should be able to remove most stains. Spray the window cleaner on the cloth, *not* on your monitor. This will prevent the cleaning solution from running down into your monitor's casing. You'll be amazed at how much better your monitor appears with a clean display, and your eyes will thank you.

4 As a last step, wipe down the outside of your computer case with the same cleaning cloth. This will remove any stains or dust that have avoided your scrutiny.

■ Auditory Clues. Like many machines that have moving parts, your computer is a constant drone of humming and whirring. After the first thrill of your computer has worn off, we tend to ignore these sounds until one day we hear a different note, perhaps a clicking or scraping sound. It may even be the absence of a sound. These are the clues you're looking for.

Hard drives. If your hard drive is starting to fail, the auditory cues it provides may give you enough time to save your valuable data. If you hear any type of scraping noise emanating from your hard drive, now would be a good time to perform a backup. Then check the computer manufacturer's Web site and see if they have any diagnostic programs for your hard

drive. If they don't, check with the manufacturer of the hard drive. These diagnostic tools can help you determine if the drive is still safe to use or if it should be replaced.

Fans. Your computer relies on fans for cooling; although reliable, they can and eventually will fail. Many CPUs have fans directly attached to them; should this fan fail, your CPU could be damaged. This is especially the case with AMD Athlon processors, as they tend to run at higher temperatures than Intel chips. Most power supplies in computers

have a fan for cooling, and the power supply will overheat if the fan fails. The lack of sound is the best indicator that your fans have stopped. If it seems just a bit too quiet, take a look and see if the fans are functioning. If not, replace them immediately. Most computer shops will do this for a reasonable price if you're not comfortable doing it yourself.

■ Software Tools. In addition to the physical cleaning and maintenance tasks outlined above, most OSes also include a decent array of programs designed to help keep your system running smoothly. The various Windows OSes include utilities such as Scandisk or Chkdsk, Defrag, and Disk Cleanup. These tools clean up files, check hardware status, and help you maximize your system's performance.

Scandisk/Chkdsk. Your hard drive stores information in sectors on platters that spin at a high velocity. Over time, some of these sectors fail, and data stored in them is at risk. The Chkdsk utility will search for bad sectors and evaluate the surface of your hard drive.

To run this utility, open My Computer, right-click your drive, and select

Properties. Select the Tools tab, then click the Check Now button in the Error-Checking section. (Win 98/Me buttons may vary slightly.) The time required to check the disk will vary with the size of your hard drive. You should run this utility monthly.

Defrag. Windows likes to store your files in one contiguous area on a hard drive. This speeds up both accessing files and loading programs. However, as your hard drive fills up, Windows may not be able to find enough space to store data contiguously. The result is that your data may end up being stored over widespread regions of your hard drive. Running the Defrag utility moves the files into contiguous regions, improving your computer's performance. Follow the same steps as in Chkdsk, but select Defragment Now in the Defragmentation section. You should also perform this task every month.

Disk Cleanup. If you're running low on disk space, Disk Cleanup may help you put off

purchasing a new hard drive. This utility searches for temporary files, files that can be compressed, and orphaned files that should have been deleted at system shutdown time. To run Disk Cleanup, right-click your hard drive in My Computer, select Properties, then Disk Cleanup from the General Tab. You won't need to run this as frequently as the previous two tasks unless disk space is a recurring issue.

■ Until Next Year.

Hopefully you won't consider maintaining your computer as drudgery. Although the tips we've discussed may not be as exciting as running out to buy the latest computer games, they aren't really that time-consuming, and they'll help protect your considerable investment. Just don't let the neighbors draft you into maintaining their computers. **LE**

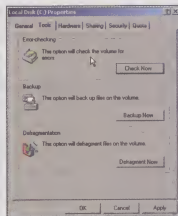
by Chris Jackson



Don't skimp on protecting your notebook. Sturdy cases are well worth the investment.



The Windows Disk Cleanup utility helps keep your files from getting out of control.



You can access disk-cleaning and backup utilities from the Tools tab of your hard drive's Properties window.

Something Wicked This Way Comes

Avoid & Clean Up After Viruses



Computer viruses had humble beginnings as proofs of concept for aspiring programmers back in the early days of personal computers. Intended as a means of exploring computer science as well as a way of engaging in harmless tomfoolery, viruses quickly mutated into today's tidal wave of malware: code designed to disrupt, annoy, and damage computers.

It's pretty rare to find a computer user who isn't aware of the dangers posed by this type of software. Even novice computer users are bombarded with warnings and advertisements for AV (antivirus) software. Ominously, the threat has now spread to other electronic devices, such as PDAs (personal digital assistants) and cell phones. In today's networked,

interdependent world, ignoring the threat of malware is a sure path to an infection that can leave you out of touch, out of sorts, and out of information.

■ **Simple, Powerful Steps.** Although the dangers that malware pose to your computer may seem overwhelming, you can limit your chances of catching the latest bug, as well as minimize the damage that occurs if you do become infected. Just as smoke detectors can't prevent fires, the steps we'll outline can only reduce the risk your computer faces. The only sure way to avoid computer malware is to unplug your computer, first from the network, and then from the wall outlet. We'll assume that you're one of the folks who likes to

use computers as something more than expensive doorstops.

The steps we outline are relatively affordable, as well as easy to implement. Designing a strategy for safeguarding your computer isn't difficult, especially if you follow our motto of "Defense in Depth."

The most powerful AV program available is your own common sense, with a liberal leavening of cynicism and skepticism. The more you understand about malware, the better you'll be able to avoid it. Here are some of the buzzwords, distilled down to the facts you need.

Vectors. Malware spreads through e-mail, Web pages, software disks, instant messaging clients, and other innumerable paths known as vectors. At one time, pundits were able to provide comfort by announcing that you couldn't receive an e-mail virus without opening the e-mail message. This is no longer true. Odds are that viruses will continue to find unique ways of spreading. "Over the next five years ... viruses will penetrate all types of computer devices," according to Kaspersky Labs; most security experts share this opinion.

Social engineering. Although many viruses spread by exploiting security vulnerabilities present in software, the majority of malware takes advantage of the user's inherent trust, tricking the user into executing attachments that carry the virus. Social engineering tactics may include scanning your e-mail program, then replying to e-mail you received. When your correspondent receives your infected reply, he thinks the e-mail is legitimate and unknowingly executes the infected attachment.

Ware, shareware, and freeware. When you try out software from a "friend" or Web site that distributes shareware or freeware, be cautious. Although much high quality software is distributed for free, some sites contain infected software as an unexpected and unwelcome bonus. Even some commercial software has been unwittingly infected with malware components. As for warez (slang for pirated software), don't expect a great deal of sympathy if the bootleg software you're downloading ends up costing you much more than if you had purchased a legitimate copy.

■ **Don't Get Too Attached.** Internet curmudgeons often complain that e-mail was never meant to function as a file transfer system. They knowingly point to the aptly named FTP (File Transfer Protocol) service as the only proper means of moving files about the Internet. When the subject of viruses comes

up, they smirk with a sense of “I told you so” that is infuriating to anyone who’s had the misfortune of being infected. If you run into one of these wizened veterans of a bygone era, give them a smile and a nod, secure in the knowledge that they are correct in their facts but wrong in their conclusions.

Although FTP was intended to provide a method for sharing files across the Internet, e-mail and HTTP (Hypertext Transfer Protocol) quickly surpassed FTP as the preferred method. Even had FTP retained its dominance, it still wouldn’t help stop the spread of viruses, although it might have made the problem more manageable. The curmudgeons also ignore the fact that many businesses rely on e-mail attachments as a fundamental business process that saves time and money. Home users have also been quick to see the benefits of e-mail attachments, such as reduced postage bills and speedier communication with friends and family.

But don’t let this sense of self-righteous justification prompt you to let your guard down. Any time you receive an e-mail attachment, a healthy dose of skepticism is warranted. If you were expecting the e-mail message and attachment, check the Subject line of the message for any irregularities in grammar or spelling that would be uncharacteristic of the sender. If the text of the e-mail message doesn’t match your expectations, it might be worth it to give the sender a call and confirm that he really sent you an e-mail message with an attachment.

Remember that anyone with a grudge can easily spoof an e-mail message with standard SMTP (Simple Mail Transport Protocol) commands or malware programs.

If e-mail attachments were consistently viewed as the potential threat they are, the spread of viruses would rapidly diminish. Unfortunately, in the continuing struggle of security vs. convenience, security is fighting a losing battle. Be sure that you scan e-mail attachments with your AV software *before* you open them. It only takes a few moments to safeguard your computer.

■ The Dirty Little Secret About Antivirus

Vendors. You’ve dutifully purchased the latest AV program from WidgetsRUs and kept its virus definitions up to date. Yet, after surfing the Web for cheap tickets to the Bahamas, you check your e-mail and see a message from your father-in-law (“thanking” you for sending him an e-mail message infected with

W32.Meltdownyourcomputer.vbs. Luckily, he knew that you never write unless you need to borrow money, so he never opened your message. So what happened? You’ve run full tilt into the gap between what the vendors imply and the harsh realities of the malware world.

Virus protection software depends upon two methodologies to try and protect your computer. The first and most successful is a signature-based system that compares files against a database of known malware. The second, more fallible system looks for malicious behavior. Known as heuristics, this method watches the processes running on your computer and tries to determine if a program is actually a virus.

Unfortunately, heuristics don’t perform very well, and malware creators try and avoid

the window of vulnerability is too large for the vendors to adequately deal with because of the introduction of several technologies.

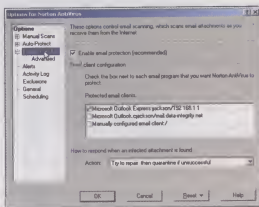
Blame Microsoft? Although many like to blame Microsoft for all that ails the Internet, some of the criticism isn’t quite fair. It’s true that Microsoft introduced several features that in combination made the spread of viruses much more problematic. Among these features was the ability to embed scripting into e-mail messages. Linked with security holes in Internet Explorer and Outlook/Outlook Express, viruses and other malware found new life. Instead of having to wait for someone to download the virus, the virus spread itself by accessing the address book found in the mail client and sending a copy of itself to everyone unfortunate to have an entry.

But let’s remember that such scripting allows for the creation of more interactive and media-rich messaging and that these are features for which users had been clamoring. And, after all, some blame has to be directed toward the users themselves. Once the cat was out of the bag, many users had grown attached to using e-mail and the Internet in an insecure manner. For example, many users cried foul when Microsoft limited the ability of Outlook 2002 to receive certain “dangerous” attachments. Unfortunately, wanting to have your cake and eat it too is all too common.

So what’s a user to do? Well, realizing the limitations that AV vendors face is a good first step. AV software and other security tools are pretty good at dealing with known threats and viruses, but your help is essential.

■ **Update Your AV Software.** AV vendors try their best to keep your software up to date with new virus definitions, as well as with enhancements to the AV software itself. We already know we’re playing catch-up with the virus creators, so it’s important not to miss an opportunity to reduce our risk. Take advantage of your vendor’s diligence and hard work by routinely downloading the AV updates. Most AV programs let you schedule this to occur automatically, although downloading the updates can take some time. It’s a good idea to check for updates on a daily basis, as even one day can make a difference between a clean computer and an infected one.

■ **Use Your AV Software.** Ironically, many users who own AV software don’t even use it until after they’ve had a bad experience. Don’t



Be sure to configure your AV (antivirus) program to scan your e-mail for viruses.

setting off the heuristics’ alarms. When a cracker creates a virus, one of the first things he’ll do before releasing it is test it against the heuristics code of current AV software. This means that at the point of release, the heuristic-based AV software is generally useless. So, all virus-protection software relies heavily on the signature database of known viruses and other malware. Herein lies the problem. Unless the virus has been captured and a signature imported into the database, the vendor’s vaunted AV software is just so much wasted hard drive space. And although the AV vendors attempt to produce signatures as fast as is feasible, they’re playing a losing game.

When viruses were spread primarily through computer disks or via files downloaded from BBSes (bulletin board systems), AV vendors had plenty of time to deal with the threat. A user had to consciously download a file through FTP, and this limited the speed at which a virus could spread. With the omnipresence of the Internet,

let this happen to you. Find the documentation for your AV software and be sure that you are using it to your best advantage. Here are some of the more important configuration settings you'll want to implement.

Scan your e-mail. When you configure AV software to scan your e-mail, it checks all messages *before* they enter your mailbox. This will help catch known viruses before they can do their dirty work. On many AV packages, this isn't the default behavior, so be sure to enable it. One drawback is that this can make retrieving your e-mail a slower process, but the wait is worth it.

Scan your system. This may seem like a redundant step, but remember that new viruses may slip through the previous step. If you schedule daily system scans, updated virus definitions will catch any lurking viruses. You'll want to configure the AV software to perform an entire system scan, including your Registry and the boot sectors of your hard drive.

Scan your removable disks. Scan any removable media before copying or executing the files stored on it. This includes commercial software because some viruses have spread through tainted commercial diskettes. If you download any files from the Internet, be sure to include them in your scan. Remember, all it takes is one infected file to ruin your day.

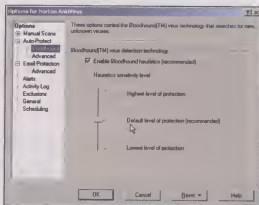
■ Keep Your Software Up To Date.

Publishers of system software (such as OSes [operating systems]) and applications (such as word processors) are well aware of the dangers viruses pose. Their most recent releases will not only have the latest in features and functionality, but they'll also be more likely to be hardened against attacks by viruses.

OSes. Most viruses take advantage of security vulnerabilities present in your OS. Although AV software may be able to shield you from known viruses that exploit these "holes," it won't protect you from new viruses that exploit the same security breaches. (Virus creators are notorious for copying or "cloning" exploits.) With versions of Windows prior to XP, there are two avenues for updating your system: the Windows Update service and patches made available through Microsoft's Knowledge Base.

The easiest way to stay on top of updates is to use the Update Service because you can install a "Critical Updates" utility that will notify you of updates Microsoft deems important. Although not every fix will be included in

these updates, it's a good start. To install the Critical Updates component, launch Internet Explorer, select Tools, then Windows Update. Or, select the Start icon, then Help And Support Center, then Windows Update. This will launch IE and open the Windows Update Web page. If the Critical Updates package



Although antivirus heuristics sound good in theory, they don't work very well in practice.

hasn't already been installed on your computer, it will be the first item offered for download. Once installed, it will periodically monitor Microsoft's support site for updates.

The Knowledge Base is Microsoft's vast repository of articles and links to patches for its various software programs. (You'll usually end up at the Knowledge Base if a security bulletin directs you to an article on the site.) Microsoft will often post software patches or fixes to the Knowledge Base even before they're available from the Windows Update page. You'll find the Knowledge Base at <http://support.microsoft.com>.

Application software. Don't forget about the application software that runs on top of

your OS. Most software vendors routinely release patches both for enhancing features and as security updates. For Microsoft programs, the aforementioned Windows Update tool is your best choice. For other application software, check the vendor's home page.

■ Back Up Your Software.

In the event that a virus slips through the layers of defense you've established, you may lose valuable files or even have to reinstall Windows. If you perform backups on a routine basis, you'll reduce the effort involved in restoring your system to its normal state. With the size of today's hard drives, backing up your entire system is unrealistic for most home users, but archiving copies of your e-mail and other important documents has become affordable with the widespread adoption of recordable and rewritable CDs. Using software such as Adaptec's Easy CD Creator (<http://www.adaptec.com>), backups are quick and affordable. (Yes, it'll cost you some money to get the backup drive and media, but ask yourself how much replacing your data would cost.)

Constant Vigilance. Now that you're armed with a set of tactics for combating viruses, remember a key point that security professionals have learned through painful experience: Security is a process. A computer that is bulletproof today may be painfully vulnerable in a month, a week, or a day. Unless you keep your defense in tune with the ever-changing threats, you'll soon fall victim to a new exploit. [E]

by Chris Jackson

Cleaning Up After The Attack

We asked Sveta Novikova of Kaspersky Labs how to tell if you've been infected with a virus:

"[For] the average user it is not so easy to tell. For example, a user may experience 'weird' behavior. It has been shown that 90% of the time this is due to malfunctioning hardware or software; the remaining 10% can be attributed to virus activity, however, it is difficult to tell the difference. Therefore it is necessary for users to employ virus protection software to expose possible virus attacks."

If your computer exhibits "weird" behavior (frequent crashes or lockups, unexplained hard drive activity, etc.) run your AV (antivirus) software to see if you've been infected. Assuming the AV software has a virus definition for what ails you, it will detect the bug and give you directions on the removal procedure. Most AV packages include tools for eradicating viruses, as well as preventing the initial infection. You'll want to be sure to remove all traces of the virus lest it return to haunt your system. □

Patch Promptly

Keep Your Software Up To Date



Patch *n.* (päch) A small piece of material affixed to another, larger piece to conceal, reinforce, or repair a worn area, hole, or tear.

We've got a secret to tell you. That nice new software product you just bought? Well, it has problems. We know that some of you are shocked to find this out. "Surely you don't mean to say that my expensive new software has errors in it?" Well, with all due respect to those who authored it, that is precisely what we mean to say. As much as we would all like to believe otherwise, all software has "problems" to one degree or another.

So, like duct tape for the digital age, software companies dutifully recognize their responsibility to fix the errors in their products and produce "patches." In the context of software, a patch is a small piece of computer code affixed to another, larger piece to conceal, reinforce, or repair a weak or nonfunctioning area of the product. Patches are a good thing; they fix troublesome products and help keep your computer software viable. They do, however, have two significant problems: First, nobody will tell you that a patch exists; usually you must go hunting for it. And second, having

found the patch, it is now your responsibility to apply it. Not to worry, though. We'll help you find out where to go to keep your system up to date. Before we do that, however, a little history of software patches is in order.

■ Problem? What Problem? Software errors are nothing new, but recognizing and fixing them promptly is. In the past, driven by the desire to shove every possible feature into a new release, vendors often had to put out maintenance updates just days (and sometimes even hours) after a major software release. The user, of course, had to struggle to keep up with the latest maintenance release or suffer the existing bugs. Much of this problem stemmed from what is called **big system disease**: the tendency to release software once every year or two, even if the release isn't strictly necessary, all the while cramming as much functionality into the new version as possible. Given the complexity of computer software, this model is guaranteed to generate a lot of problems that take a long time to fix.

Thankfully, along came a process called **continuous development**. The principal idea

of continuous development is to build something with fewer features but release it more often. The software developer is then able to focus scarce resources on a smaller number of features, thereby enhancing the stability of the product. At the same time, it also fixes errors found since the last release. With this model, a user only has to live with the worst errors for three months or so before a new maintenance release comes out. (With a critical security or data corruption bug, you can usually expect a fix immediately.) This revolutionary concept changed the way we look at software. Where once we would dutifully march to the store every two years or so to buy the upgrade to our favorite product (hoping to find certain bugs fixed), some software companies now come out with maintenance releases and patches monthly.

The downside of this new model, however, is the greater number of fixes, patches, and updates of which the user must be aware and apply. Knowing that these are available is difficult, finding them can be absolutely painful, and applying them can be disastrous. Thankfully, new tools and techniques are designed to inform you of software updates and help you find and apply them.

■ Self-Updating Software. Many new software products (including Windows XP) include a function that helps you keep them up to date. If you have an Internet connection the product can use, it will detect the availability of an update and install it if you wish. Most will give you the option of doing this automatically or letting you initiate the update yourself. In WinXP, for example, you can run the Windows Update function manually from the Start menu or let the OS (operating system) update your machine using the Automatic Updates function. Similarly, Norton Antivirus and ZoneAlarm Pro (a personal firewall program) will automatically detect the presence of updates and ask you if you want to install them. However they detect updates, all programs we're aware of will ask you before downloading and installing a patch or update.

Automatic updating: a double-edged sword. The question of whether to let a program automatically scan for updates is something of a challenge. We're naturally suspicious of programs that automatically connect to the Internet, no matter what the reason. Privacy is our chief concern here. We can't help but wonder what sort of information the program collects and transmits to the software

vendor, where they store it, and what they do with it. With personal privacy disappearing faster than the Brazilian rain forest, we tend to dig in our heels and not let anything know more about us than absolutely necessary. However, this auto-updating provides the best

assurance that your system will stay up to date. Most of us just never seem to find a convenient time to run those pesky little updates, much less go searching for patches. Many people wait to update a product until after they have experienced a problem, rather

than heading off the problem by keeping the software up to date. The choice is yours. If you're good about running the updates, we suggest taking control of your computer and limiting the amount of automatic Internet scanning and updating. If you're not very good at staying on top of such things, you can have the product do this for you, but we suggest that you read the privacy statement closely so you know what data the company collects about you and what they do with it.

Driver Destinations

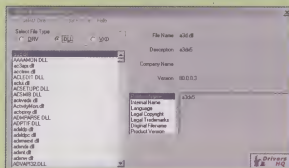
A driver is a potentially problematic piece of software. Simply put, a **driver** is a small software application that controls (or "drives") some sort of device on your computer. Your system is loaded with them, controlling everything from your monitor, keyboard, and mouse to your network card, hard drive, and modem. These programs can be more troublesome than applications because they interface (or, in some cases, fail to interface) directly with the physical hardware and because various hardware vendors create them independently of each other. Often, they don't play nice with one another. If you know where to get them, it's easy to update a driver yourself, possibly sparing you a painful trip to the repair shop. Thankfully, most hardware vendors are good about updating their drivers for new OSes (operating systems) and other hardware. (And why not? Doing so means that they can keep selling their products.)

To find them, however, you'll have to know where to go. It is somewhat ironic that the hardware vendor may not be the best place to go to find drivers. They often don't keep copies of older drivers and don't provide you a way to benefit from other users' experience and feedback. For this, you'll have to visit one of the

many driver Web sites, such as the ones listed below.

- **DriverGuide.com** (<http://www.driverguide.com>). A free site with a large collection of more than 60,000 drivers. DriverGuide.com has been around since 1997 and features an area where users can upload

finding a manufacturer difficult. But what if you don't know the manufacturer? This is where the FCC search comes in. If you have a piece of hardware with no name on it (this is more common than you might think), you can determine the manufacturer by searching for



Driver Detective from DriversHQ.com can help you identify exactly what drivers are on your system and whether they are out of date.

hard-to-find drivers and a driver request board for hunting down your quarry. If you can't find it here, it probably no longer exists.

- **Driverzone.com** (<http://www.driverzone.com>). A free site with a good set of drivers. It gets top honors, however, mostly for two very useful features: 1) A "Lost Company" directory and 2) a search by FCC number. The "Lost Company" feature is a blow-by-blow history of bankruptcies, mergers, and other events that often make

the FCC number printed on the component.

- **DriversHQ.com**
(<http://www.drivershq.com>). This is a very popular free site; more than 2 million people visit it each month. Hosted by PC Drivers Headquarters, it features a large database of drivers and a unique utility you can download called Driver Detective 2.0. This will check all the drivers on your machine and indicate which ones aren't current. Armed with this information, you can decide which drivers you need to update. ☐

■ **Driver & Patch Sites.** The need to stay up to date on software patches and updates created a whole new breed of Internet sites focused exclusively on the subject. Web sites such as The Software Patch (<http://www.softwarepatch.com>) house databases chock-full of application and OS patches. Others sites are focused exclusively on drivers, a particularly error-prone sort of software (see the "Driver Destinations" sidebar). Nearly all of these sites are advertising-supported and therefore free to the user.

Besides providing patches, many sites offer help in applying them, user feedback on the quality of various patches, and a chance to interact with other users through online forums. This last service is often the most valuable, given that somebody out there somewhere has probably already experienced (and solved) your problem. For those of you who have tried to find patches by going to the software vendors' sites, you'll appreciate the one-stop-shopping these sites provide. They pride themselves on staying up on the latest releases, so you don't have to go foraging for them yourself. Some sites, such as <http://www.versions.com>, will even keep a list of the software you have and e-mail you when an update is posted. With help such as this, there is no longer any reason to have out-of-date software. We suggest bookmarking and visiting these sites regularly.

■ Update Services. But what if you just want things kept up to date with a minimum of effort or personal involvement? If you're so inclined, services are available that take care of everything for you, making sure that every piece of software on your system is current. For a yearly fee, services such as McAfee.com's Oilchange Online will scan your system, catalog every piece of software, and compare the version number against its frequently updated database of current patches, fixes, and updates.

The main advantage of a service of this sort is the identification of patches for obscure pieces of software you didn't even know you had. The service distinguishes itself from the typical driver and patch sites by telling you what it thinks you need, rather than assuming that you already know. Oilchange is still a far cry from a completely automated system, however. You still have to remember to go online and initiate the scan yourself (it isn't scheduled automatically), and the software won't make the final decision about which to patches to apply; that remains your responsibility. Making this decision isn't easy. If you update everything all the time, sooner or later you'll wind up in trouble. Because patches are software, they *also* have bugs, and some of them are worse than the ones they were created to fix. (It's a crazy world, isn't it?) In order to get the most out of updating your software, it is critical you know when to apply a patch and when to leave something alone.

■ To Patch Or Not To Patch. Knowing how to find and apply patches is different from knowing whether you should use one on your system. Conventional wisdom says that if a patch is available, you should apply it. This is true in certain circumstances and for specific kinds of software, but don't universally apply this rule to every software product you own.

OSes. If a patch exists for your OS, you should get it and apply it. OSes control how your system functions; Staying up to date on patches will improve your system's performance, functionality, and compatibility with other hardware.

Noncritical application software. We never patch application software unless it isn't performing correctly. Does it do what you want it to do? Leave it alone.

Drivers. If a hardware device is working properly, we don't mess with it. Updating a driver that's working fine is asking for trouble. On the other hand, if you're suddenly having trouble with a device that worked fine a few weeks ago, an obsolete or incompatible driver may very well be the cause.

Security software. When it comes to security software such as antivirus or firewall programs, *always* update as soon as a patch is made available. These companies work on the front lines of the computer security and virus wars and are constantly trying to stay one step ahead (or no more than one step behind)

crackers and virus writers. As soon as the hackers discover a weakness that can be exploited, these companies patch it and send out an update. If you don't have the update, you leave yourself wide open to all sorts of mischief.

■ Stay Up To Date. We know staying on top of the latest patches, fixes, and updates is a

pain. But if you use a computer, there's simply no way around it; failure to do so means running out of date, buggy, and possibly unsafe software. Take advantage of some of the newer auto-update features many software vendors offer, and at least you'll be spared some of the burden. [E]

by Ronald Houtt

Driver Rollbacks In Windows XP

Making changes to your computer takes courage. Frequently, things go from bad to worse, and that "simple" upgrade can cause your computer to roll over and die. Drivers in particular are legendary for causing more problems than they solve. If installing a new driver has ever completely thrashed your system, you're well acquainted with the time-consuming process of restoring your system from a backup tape or CD-ROM. (You did make a backup before installing that new driver, right? If not, you're in good company; most of us don't. We'd rather roll the dice and hope the installation goes well, which it usually does. But not always.)

When things don't go right, it would be very nice if we could simply press a button and get back to where we started. A nice idea, indeed, but nearly impossible to do when the OS (operating system) is hosed and the machine won't even boot. What we really need is an OS that's smart enough to save its previous driver settings and revert back to them when

something goes wrong. Thankfully, it finally occurred to Microsoft that this would be a good idea, too. Enter Windows XP. It has a Device Driver Rollback feature that sets the standard for future OSes.

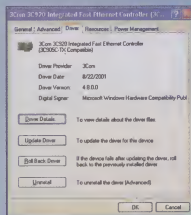
If you're using WinXP and your machine won't boot after installing a new driver,

Sometimes a driver causes the machine to do strange things instead of just making it crash altogether. This is actually a more difficult problem to solve because it is often intermittent and hard to chase down. If you've recently updated a driver and your machine starts acting strangely, the

device's Property list now has a Roll Back Driver option. (Go to Start, then Control Panel. Double-click System. Select the Hardware tab, then click Device Manager. Double-click the device in question.) Clicking the Roll Back Driver button will revert to the previous version of the driver.

Although booting from the Last Known Good Configuration is also available in Windows 2000, the Roll

Back Driver option is exclusive to WinXP. If you're using any other version of Windows, your only option for undoing a driver installation is setting a Restore point before installing the new driver (always a good idea, regardless) and using Restore to recover if anything goes wrong. ■



Windows XP integrates a Driver Rollback function that lets you revert to the previous version of a driver.

simply restart it and press F8 to display alternate boot-up options. Select "Last Known Good Configuration." Your system will restore all settings to the previous working version and you can go from there. You'll then need to call your hardware manufacturer's support line, but at least you can use the machine in the meantime.

Your Secret Weapon

A Startup Diskette Provides A Security Blanket



Computers are marvelous contraptions, complicated collections of electronic and mechanical parts, all working together to perform whatever tasks you ask of them. Their relatively small boxes pack high-speed processors, massive memory chips, and hard drives that often hold more than 100GB of data.

Nestled among all that impressive power is the lowly floppy drive, home to media that's limited to a minuscule 1.44MB of data. A floppy diskette is barely big enough to hold a multipage word processing document or a single photograph, yet this little wonder of the computer world can rescue your computer and its data from the edge of oblivion.

Be Prepared For The Worst. Computer hard drives are very reliable devices, especially when you consider how frequently the drive's platter revolves around its axis. Some of the hard drives common in today's systems operate at 7,200 revolutions per minute. In an average 8-hour day, these hard drives spin around nearly 3.5 million times. It's no surprise

that hard drives occasionally fail; what's surprising is that they don't fail more often.

Whether it's drive failure, corrupt files, a damaged Windows Registry, or just bad luck that causes the problem, you'll need to get your computer running before you can restore your data. PCs have an annoying habit of failing in a way that prevents the computer from even booting into the OS (operating system). So, the first step in recovering from hard drive failure is getting your computer to boot; that's where the floppy diskette comes into the picture.

Floppy drive to the rescue. With the exception of recent Apple Macintosh systems and a few specialty PCs, all new PCs include a 3.5-inch floppy drive. In order to boot from a floppy, two conditions must be met: the floppy must have an OS on it and your computer must check the floppy at boot time to see if it has an OS on it. Fortunately, most computers are configured to check the floppy first during the boot sequence.

To protect yourself against future disaster, create a floppy with an OS on it for use as an

emergency startup diskette (also called an emergency boot disk). The time to do that is now, before your hard drive starts having problems. The method for creating a startup diskette is a little different for each OS, so we'll cover each one separately.

Windows 98. When you first installed Win98, the setup program offered to create a startup diskette for you. If you answered Yes, you inserted a floppy diskette, and Windows created a Win98 startup disk. Chances are that you decided not to bother or that you created the startup disk but now have no idea where it is. Either way, it doesn't matter; Win98 lets you make another startup diskette at any time.

Create a startup disk. To create a basic startup disk, find a blank floppy diskette and your Win98 CD. Go to the Start menu and select Settings, Control Panel. In the Control Panel window, double-click the Add/Remove Programs icon. When the Add/Remove utility launches, click the Startup Disk tab, then click the Create Disk button. (You may be asked to insert your Win98 CD.) You'll be prompted to put a blank floppy diskette into your A: drive. Windows will then write all the files needed to boot your PC onto the floppy. Remove the floppy, label it Win98 Startup Disk, and put it in a safe place. (This time, write yourself a note about where you put the diskette. Then try not to lose the note.)

The startup diskette lets you boot to DOS 7, the version of DOS included with Win98. It also creates a 2MB RAM disk, which it uses to copy a set of system utilities needed to help get your system up and running. The diskette also lets you access your CD drive, something Win95 boot disks didn't permit without manual modifications. There's no guarantee it will work with your particular system, however. Hundreds of CD-ROM systems are available, and there's no way for Microsoft to include drivers for every one. Instead, they supply a few common drivers, plus a generic driver.

The best way to find out if your diskette includes the correct CD-ROM driver is to try it out. Put the diskette in your floppy drive and restart your computer. When the computer boots, a list of startup options will appear. Select option 1 to start up with CD-ROM support. When the boot process finishes, you'll see a command line prompt, A:\>. Insert a CD, then type DIR, the DOS command for displaying a directory listing of the drive. Your CD drive may have been reassigned a new drive letter that's one letter higher than its original

value. This happens because the RAM disk is assigned a drive letter first, and then the CD drive letter is assigned. If your CD drive was E:, it will be F: when you use the startup disk. In that case, type `DIR F:` and press ENTER. If you see a directory listing of the CD, all is well. If not, you may need to add the driver for your specific CD drive to the startup disk.

Add a CD-ROM driver. Find the driver for your CD-ROM, usually located at C:\ in a folder bearing the CD manufacturer's name. For example, our Win98 computer uses a Mitsumi CD drive; the driver is in a directory at C:\Msm. You can also copy the driver from the floppy diskette or CD that came with the drive. The driver's file name will end in .sys, for example, Mtmcdai.sys. Copy the driver to the root directory of your floppy. If you can't find the driver or the original installation disk or CD, you may be able to download the driver from the manufacturer's Web site.

Next, we need to add a line of text to the `Config.sys` file on the startup diskette, so the boot process will know to look for a CD-ROM driver. You can use any text editor to do this, including Notepad. (To open Notepad, go to Start, Programs, Accessories, Notepad). From Notepad's File menu, select Open. Locate your A: drive in the dialog box, and select the file called `Config.sys`. Once the `Config.sys` file is open, you should see a text file with the following information (or something very similar) in the [CD] section:

```
[CD]
device=himem.sys /testmem:off
device=oakcdrom.sys /D:mscd001
device=btcdrom.sys
device=flashpt.sys
device=btcdrom.sys /D:mscd001
device=aspi2dos.sys
device=aspi4dos.sys
device=aspi8u2.sys
device=aspcd.sys /D:mscd001
```

Add the following line at the *start* of the [CD] section:

```
Device=(your CD-ROM driver name)
/D:MSD001
```

For example, the entry for our Mitsumi CD drive would look like this:

```
[CD]
Device=MTMCDALSYS /D:MSCD001
device=himem.sys /testmem:off
```

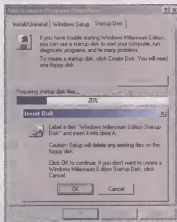
```
device=oakcdrom.sys /D:mscd001
device=btdosm.sys
device=flashpt.sys
device=btcdrom.sys /D:mscd001
device=aspi2dos.sys
device=aspi8dos.sys
device=aspi4dos.sys
device=aspi8u2.sys
device=aspi3d.sys /D:mscd001
```

Go to File, Save to save the file on the floppy. You should now have a startup diskette that's usable on your current computer, as well as on other computers running Win98. Friends and family will appreciate your attention to detail when they're in a panic trying to boot their systems.

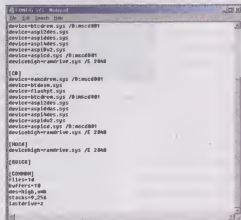
■ Windows Me. When you install WinMe, it offers to create an emergency startup disk for you. If you can't find the WinMe startup disk you created, or you didn't bother to create one, it's not too late. Like Win98, WinMe can create another one for you at any time.

First, find a blank floppy diskette, go to Start, Settings, Control Panel. In the Control Panel window, click the Startup Disk tab, then click the Create Disk button. When WinMe asks for it, insert the floppy and then click OK. WinMe will write the necessary files to the diskette.

If you've read the Win98 section above, creating a startup disk with WinMe may seem like déjà vu all over again. The procedure is the same, but the outcome is not. When creating WinMe, Microsoft took advantage of the opportunity to eliminate support for many older devices, programs, and drivers. As a result, WinMe startup disks may not support older DOS programs. This will have little effect on the intended use of the floppy as an emergency startup tool, but



You can use the Add/Remove control panel to create a startup diskette in Windows 98 and Windows Me.



The [CD] section of the Config.sys file is the place to add CD-ROM drivers, if needed.

it may squash the hopes of anyone planning to use the disk to run older DOS-based utilities and games.

Once you've created the WinMe startup disk, make sure it works. If something went wrong, it's better to find out now than in the middle of a crisis. As we noted earlier, Microsoft can't include drivers for all CD-ROMs, so the startup disk may or may not work with your CD drive. To find out, insert the disk into your floppy drive and restart your computer. When your system reboots, a list of startup options will appear. Select

option 2 to start up with CD-ROM support. When your computer finishes booting, you'll see a command line prompt, A:\>. Insert a CD, then type DIR, the DOS command for displaying a directory listing of the drive. As noted above, your CD drive may have been assigned a drive letter that's one letter higher than its original value. If your CD drive was E:, it may be F: when you use the startup disk. In that case, type DIR F: and press ENTER. If you see a directory listing of the CD, all is well. If not, you may need to add the driver for your specific CD-ROM to the startup disk. (See Add a CD-ROM Driver, above).

■ **Well, Now That You've Got It, How Do You Use It?** With any luck, you'll never need to use your startup

disk. In case you do, however, here are a few tips to make things easier.

Write-protect the startup diskette. Write-protect the disk before you even think about inserting it into a drive on any computer, including your own. There are many reasons why a computer can fail, and one reason is a virus. The last thing you need is an emergency

startup disk that's infected with a virus. An infected startup disk could easily let you restore your Windows OS, only to infect the newly created system. Once infected, your OS would start exhibiting some of the same problems that caused you to reinstall the system in the first place. Result? A never-ending cycle of headaches and lost files. To write-protect your startup disk, slide the protection tab on the back of the floppy so you can see light through the opening.

Boot to DOS. The first thing your startup diskette should let you do is boot your computer into a DOS environment and access your hard drive(s) and CD drive. The startup diskette includes a minimum set of DOS 7 bootable system files, along with disk repair tools (Scandisk and Chkdsk) and several disk setup tools (Fdisk for partitioning and resetting the Master Boot Record, Format for formatting your drives, and Sys for copying system files onto newly-formatted drives). These tools should let you inspect and correct any problems caused by errors generated by your hard drive.

Copy and delete files. Once you've booted from the startup diskette, you can use standard DOS commands (Copy and Del) to copy and delete files. This is handy when you're unable to boot into Windows because of a missing or damaged Windows file. Just insert your Windows CD and copy the missing file to the appropriate place on your hard drive.

Use the Delete command to remove any recently installed files that may have precipitated your system problems

Use that second hard drive. If you have more than one hard drive, copy important files to the second hard drive before reinstalling Windows to help prevent the loss of important data.

Reinstall Windows. If all else fails, you can reinstall Windows. The Windows installer overwrites its own system files and folders, but it shouldn't remove user data files. However, it may create problems for installed programs, forcing you to reinstall them before you can access your data files. Before reinstalling Windows or any programs, back up all of your data files.

To reinstall Windows, insert the Windows CD. Use the DOS command to change to your

CD drive's letter: From the A:\> prompt, type CD E: (replace E with whatever happens to be the correct letter for your CD drive), and press ENTER. Type Setup.exe and press ENTER to start the Windows installer.

```

Preparing to start your computer.
This may take a few minutes. Please wait

The diagnostic tools were successfully loaded to drive D.


MSDBEX Version 2.25
Copyright (C) Micromsoft Corp. 1986-1995. All rights reserved
Drive E: Driver MSCD001 unit 0

To get help, type HELP and press ENTER.

```

When you use your emergency startup disk, your CD drive may be reassigned to a new letter. The group of lines starting with MSCDEX Version will tell you the new drive letter.

```

8. Select the Device tab in the Root
   pane.
   
   2. Add the computer without the SUM support
      from the Device list.
   Enter 1 and Enter.

```

When you boot from a Windows 98/Me startup disk, you can choose whether to access your CD drive.

You can view a list of available commands in the Windows XP Recovery Console by typing **Help** at the command prompt.

■ Windows XP Home & Professional. XP is a new breed of Windows, more closely related to Windows NT than to the Win9x/Me products. Because of its NT underpinning and some new capabilities, you may find less use for boot diskettes and less need to repair or reinstall your OS. It doesn't pay to be too optimistic, though. Realizing that safe was better than sorry, Microsoft included tools to help you repair and restore XP.

If your computer supports booting from a CD, you may not need a startup diskette. (In the unlikely event that your computer doesn't support booting from a CD, check your users manual for information on what to do in case of hard drive failure.) The WinXP CD contains the tools you'll need to repair or reinstall the

OS. But why take chances? There's no harm in having multiple ways to boot your system.

Create WinXP boot floppies. Booting an XP system requires as many as six floppy diskettes. If you've been looking for the Create

Disk option found in Win9x/Me systems, you can stop looking. You won't find one. But that doesn't mean we have to hang around the command prompt, copying files. We'll let Microsoft create the floppies for us.

It's not clear why Microsoft dropped the built-in method for creating boot floppies, but in exchange, boot disks are available for downloading from the Microsoft Support Web site. Open your browser and go to <http://support.microsoft.com>. Above the search box on the left side of the page, select Windows XP from the drop-down list of categories. Type Q310994 in the "For solutions containing" field and click Search Now.

In the search results window, click the Obtaining Windows XP Setup Boot Disks (Q310994) link. Scroll down to the middle of the page and click the link labeled English Windows XP Home Edition or English Windows XP Professional, depending on which version of the OS you're running. Scroll down the page and locate the download link, labeled WinXP_EN_HOM_BF.EXE - 4,387 Kb (if you chose Home Edition) or WinXP_EN_PRO_BF.EXE - 4,390 Kb (if you chose Professional Edition). Click the link to start the download process. When the download is finished, exit your browser. Find the file you downloaded, and double-click

its icon to extract it. Click the Yes button to agree to the license terms. A command prompt window will open, with instructions for creating the disks. You'll need six blank, formatted diskettes, and a marker to label each one with its correct number. Follow the on-screen instructions to create the six floppies. If you run into a problem in the future, you'll be able to use these floppies to boot your computer and start the XP installation or use the XP Recovery Console to repair damaged OS files.

WinXP CD-ROM boot. If your computer supports booting from a CD (as is likely the case, these days), you can use your original WinXP CD to start your computer and reinstall WinXP. Insert the WinXP CD, then restart your computer. The computer will check the CD to

see if it is bootable; if it is, you'll be instructed to "Press any key to boot from the CD." (The specific wording may vary, depending on your computer manufacturer.) Press any key and WinXP will boot directly to the Windows Setup screen. Here you'll have the option to continue with a WinXP installation or access the Recovery Console (see below) to make repairs. When you select the WinXP installation option you can choose Fresh Install, which overwrites all Windows files and drivers, or Repair, which replaces only the files and drivers that are missing or corrupt. With either method, your personal data files should be left intact. Remember, though, that any applications you've previously installed may need to be reinstalled to function correctly.

Use the Recovery Console to make repairs. Often, you can use WinXP's Recovery Console to repair whatever damage is preventing WinXP from starting or from working correctly. However, the default WinXP installation doesn't install the Recovery Console. You'll need to

boot from the WinXP CD, or from the boot floppies you made above, to activate the Console.

Most WinXP problems involve specific files and devices, rather than a boot problem associated with the hard drive itself. When you install WinXP, you can create a dual-boot system; then, during the boot process, you'll be asked if you want to boot into WinXP or the Recovery Console. This dual-boot system provides much faster access to the Recovery Console.

To install the Recovery Console as a boot option, insert your WinXP CD, then go to Start, Run. In the Run box, type `D:\i386\Winnt32.exe/cmdcons`.

Replace the letter *D* with whatever is the correct letter for your CD drive.

In the Windows Setup window, click Yes to confirm that you want to continue the installation. The installer will attempt to connect to the Windows Support Web site and ensure that the installer files for the Recovery Console are up to date. If they're not current, the

installer will download new files as needed. If or when the files are current, Windows will complete the installation and display a confirmation message. Click OK to exit the installer.

The next time you boot, your computer will display two boot options, WinXP and Recovery Console.

Booting to the Recovery Console. During the boot process, WinXP will display two boot options. Select the Recovery Console. The Recovery Console only works in one Windows environment. If you have multiple versions of Windows installed on your computer, select the one you want the Recovery Console to use. After you make your selection, the Recovery Console will ask for the Administrator's password. Enter the password, if you assigned one; otherwise, leave it blank and press ENTER. The Recovery Console will display a command line prompt that's similar to DOS. For a list of available commands, type **Help** at the prompt.

Like the Win9x/WinMe boot disks, the WinXP Recovery Console gives you specific tools to help correct problems. You can run `Chkdsk` to verify and repair hard drive problems, format drives, work with files and directories, or repair drive boot sectors. You can also work with specific WinXP services that may be causing problems. You can enable and disable these services, turning off one that's causing problems, or turning on one that was accidentally disabled.

Even if it turns out that you need to reinstall WinXP, use the Recovery Console first to save important files by copying them to a different partition or drive. The Recovery Console's `Copy` command lets you copy any file to any Windows system directory, or to the root directory of any nonremovable drive. At the prompt, type `copy C:\Myfilename D:\` and press ENTER. (Replace the letter *D* with the correct letter for the destination drive.) This ensures the files won't be overwritten when you reinstall XP.

■ **Just Do It.** If you haven't yet made a Win98 or WinMe startup diskette or a set of WinXP boot disks, there's no time like the present. Being prepared for potential problems can save you a great deal of grief. Although the startup or boot diskettes may not fix every problem you'll ever have with your computer, they can help keep you from losing important files that you neglected to back up. [E]

OEM Restore Disks

For the last few years, Windows-based computers have had the ability to boot from CDs, a better method than booting from floppies. If you've ever struggled to use a startup diskette to reinstall Windows onto a newly formatted hard drive, you know how cumbersome it can be. Booting from a CD couldn't be easier: Just insert the bootable CD and restart your computer.

Microsoft took advantage of this capability by releasing Windows XP on bootable CDs, and computer manufacturers also take advantage of this feature. Many PCs include a bootable CD-ROM Restore Disc that lets you go back in time and restore your computer to the state it was in when you bought it.

There's always a catch. It sounds like a perfect solution. The problem is what

the Restore CD *doesn't* do for you. Most Restore CDs use a disk image, a snapshot of the original hard drive configuration. The disk image is stored in a single file that contains the data and the free space originally found on the hard drive. When you restore a disk image, the hard drive looks exactly like the image. Where there originally were files, there will be files; where there was free space, there will be free space. Any changes you made, such as programs, settings, or personal data files you may have installed or created, are gone.

Restore CDs can also present a problem if you've upgraded to a larger hard drive. If you've replaced your original 20GB drive with a 40GB drive and the new drive crashes, the Restore CD will dutifully cre-

ate an exact copy of the original 20GB drive, leaving the remaining 20GB of space unusable.

Some Restore CDs store a disk image containing the most recent backup of your system in a hidden partition on the hard drive. Replace the hard drive, and there's no disk image to restore; any system updates you've made are lost.

What you can do. You can avoid part of the problem by taking the time to make regular backups of your hard drive. Check your system's Restore function; some include a backup process.

One solution to restoring a disk image to a drive that's larger than the original is to create multiple partitions. The first partition is the same size as the original hard drive; the second partition consists of the remaining drive space. □

by Tom Nelson & Mary O'Connor

The Tech Support Mambo

How Can I Get The Most Out Of Tech Support?

The prospect of calling technical support sends chills up the spine of many a computer user. Not wanting to appear foolish to the faceless "expert" on the other end of the line, you struggle desperately, sometimes for hours, to fix problems you have no clue how to solve. Pride swallowed, you queue up just to speak to an actual human, only to struggle through a tedious and time-consuming troubleshooting process. To top it all off, you might not even get a solution on the first try. Still, sometimes we just have to make that call. But "technical support" doesn't have to be an oxymoron: With a little insight and preparation, you can help yourself get the most timely and helpful support possible.

■ **How The Game Is Played.** The first key to getting the best help possible is understanding how technical support services work. This will help you know what to expect, make the best choices for your situation, and provide the information that support personnel need in order to help you. We are going to operate here on the assumption that you've tried your other options before calling tech support, including reading the manuals, browsing any available online help, and checking out the relevant articles from this and other *Smart Computing* volumes.

All about the queue. Call centers focus on metrics such as average wait time, number of calls answered, and first-call closure. Support personnel look for ways to avoid queues or work through them quickly when they do develop. If you can avoid a queue or a busy period, you will be better off. Your agent will be less pressured and more likely to spend time troubleshooting in earnest. Many companies have real-time queue information on their Web sites, letting you see the number of people waiting ahead of you and the approximate time to get to the front of the queue. Unless your problem requires immediate attention, you may find yourself spending less total time

on the problem if you can call back during a slower period.

Make an agent yours. Companies judge support personnel on efficiency metrics, as well. Help yourself get more effective support by bringing good information and a no-nonsense approach to the call. The less time you spend on the phone, the better off you are; not only will you save money if you're using a fee-based service, but agents will recognize that your competence assists them. Think of support as a partnership between you and the agent. You both have similar goals: get the problem solved in a timely and pleasant manner, then move on to something else. The more you prepare and the more information you provide, the better questions agents can ask and the quicker they can identify a solution.

Dealing with escalation. If your problem isn't solved on the first call, the agent will "escalate" your issue, passing it along to someone else for resolution. You want to avoid this situation if you can; escalated calls take longer

to resolve and sometimes get lost in the shuffle. If you get stuck with an escalation, make sure you get a ticket or incident number and find out how you can check on your issue's status.

Changing channels. In the support industry, "contact centers" are replacing traditional call centers, providing users with a variety of channels for requesting and receiving support. In addition to the telephone, these channels can include e-mail, fax, online chat, and interactive Web-based resources.

Consider approaching support from one of these other angles; they're often less busy than telephone support and, depending on your problem, may even be better suited to your needs. If you're having trouble with a Web-based application, for example, online chat will let you talk with support and stay online at the same time. If you have a simple question that doesn't need an immediate answer (a setting for your e-mail client, for example), you can e-mail support and work on other things while you wait for an answer. And always, as a part of your preparation, check a company's online help resources before contacting tech support.

■ **Preparation Is The Key.** An abundance of information will help make your tech support time count. The more knowledgeable you are, the less time your agent has to spend gathering information about your system and the problem you are having. Being prepared will also help to eliminate wasteful guesswork,



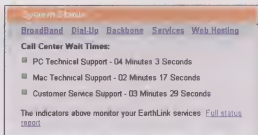
which can lead you down any number of fruitless paths.

Know your system. At a bare minimum, you should always have the basic stats on your system handy. If you don't already know these details, create a cheat sheet you can refer to whenever working with your PC. Always include information about the make and model of your computer, your OS (operating system), your processor model and speed, the amount of memory you have, your hard drive space, how you connect to a network or to the Internet, and a list of any hardware or added peripherals. This data will help you and your agent spot any known conflicts or problems with system requirements.

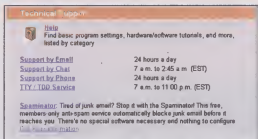
Know the source of trouble. You should also get as much information as you can about the application (if a software issue) or component (if a hardware issue) with which you are having trouble. Get the version number of any software (you can almost always find this by clicking Help on the toolbar and choosing About from the menu), and the make, model, and serial number of any hardware. Many technical problems are isolated to a particular version or model; having this information available can make support much easier.

Know your problem. The more detailed an explanation you can provide about your specific problem, the better help you'll receive. Identify exactly what you want to do (transfer photos from your new digital camera to your PC), know how you're trying to do it (plugging the cable into the serial port, installing the companion software, and clicking Download Photos from the File menu), and describe what's happening instead (the software is searching for the camera but can't seem to find it). This kind of information will get you much further in much less time than if you just say, "Um, my camera isn't working."

Support Yourself. You can also help tech support help you by doing some basic troubleshooting on your own, before you call. Few things are more embarrassing than spending 20 minutes waiting on the phone and talking with an agent for 10 more, only to find that the problem is that your printer isn't plugged in. Even if you don't solve the problem yourself, working through some of these steps will save you time on the phone and help you give tech support valuable



EarthLink's support site tells you how long you can expect to wait for support using various channels.



Like many companies, EarthLink provides users with multiple tech support channels.

information (whether you can make sense of it or not) about what's happening.

When in doubt, reboot. The first thing you should always do when any technical problem arises is reboot your system and try again. If you're having trouble with a piece of hardware, cycle its power, as well (this may be as simple as unplugging it, waiting a few seconds, and powering it back up). You'll be amazed at how many problems rebooting solves. It will also save you time with tech support—often the first thing an agent will ask you to do is reboot. Taking care of this in advance will save you time on the phone.

Play games. Some companies actually play 20 Questions as part of their interview process for tech support agents. This verifies an agent's ability to ask succinct, direct questions that make use of the process of elimination. You can help yourself by taking the same approach. Try to isolate the problem by trying different combinations of options, settings, or cables (depending on the nature of your problem). Being able to explain, "I tried this and that and the other

thing and here's what happened," will save time troubleshooting over the phone. (It might even get you a job.)

Cover the funky stuff. Before you call, try to identify any environmental factors that might contribute to your problem. Does the application freeze only at a certain point or only when another particular program is running? Does the printer give you an error only after you use the Zip drive or only after you successfully print an initial document? This type of information often makes all the difference in tech support and is also usually the hardest to re-create. Many problems of this type are unique to your system and how you use it. A tech support agent will have no way to guess at these—any information you can provide in this area will be invaluable.

Do a little research. Before calling tech support, make sure to research some common support venues. This research may not only help you avoid a support call in the first place but can also provide useful clues for troubleshooting. Users manuals and built-in help features are often the best places to start. Most companies offer FAQs (Frequently Asked Questions), support documents, or knowledge bases in the product support areas of their Web sites. (For more information, see the "Using The Microsoft Knowledge Base" sidebar.) Sometimes the best information comes from other users experiencing the same problems as yours. Often, running a query from a

Internet search tool will produce useful results; archived conversations from obscure message boards or users groups will sometimes provide you with the answers you need.

Work The Phones.

Arrange a way to be at your computer when you call; the troubleshooting process will usually require you to try certain things or change settings, and you don't want to have to call back with status reports each step of the



Have your system information handy when calling support. You can access most of the information by right-clicking My Computer and choosing Properties.

way. If you have questions about an online application or are having trouble connecting to the Internet through a dial-up connection, find

a way to be online and on the phone at the same time. Mobile phones are perfect for this scenario. Try to maintain your view of the support process as a partnership. You and your agent need to work together to solve the problem if possible—getting angry or impatient during the troubleshooting process won't help anyone.

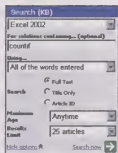
You can help yourself when you actually make contact with tech support by organizing your thoughts and information in advance. Plan the beginning of the call to make sure you present the problem clearly and concisely, without leaving out any

important information. Essentially, you want to present all your information up front to help the agent make a decision about the problem and likely solution as quickly as possible.

- First, introduce yourself and the issue: "Hi, I'm Greg, and my PC doesn't seem to recognize my PDA in its cradle." This approach creates a personal connection, introduces the problem, and (last, but certainly not least) makes sure that you have reached the right person. You don't want to waste time running through your entire system specs and troubleshooting history only to

be transferred and then have to go through the whole drill all over again.

- Second, explain your problem as thoroughly as you can manage: "I installed the synchronization software, then rebooted and plugged in the cradle, and then set the PDA in its slot; I pressed the button, and nothing happens." This kind of detailed presentation is much more helpful than a general complaint such as, "This thing's not working right." Your agent can more quickly and accurately define the exact problem you're having, saving you, both time and frustration.
- Next, describe your troubleshooting: "After rebooting, the PDA synchronized once but won't do it again. I tried it on another machine and it works fine but I tried a different cradle on my PC and had the same problem." These details let your agent know what you've already done (preventing you both from wasting time repeating various tests) and may provide some valuable clues as to the source of the problem.



Search options at Microsoft's support Web site help you refine your queries in order to quickly find answers to your questions.

Using The Microsoft Knowledge Base

For most of us, the odds are pretty good that, if we need help with software, Microsoft products are involved. Become familiar with Microsoft's Knowledge Base and other online help resources, available at <http://support.microsoft.com>. It is an invaluable, if potentially overwhelming, resource for all sorts of technical problems. In fact, even if your question isn't explicitly Microsoft related, you may still find information about how your hardware or other applications relate to Windows or other Microsoft products.

First, navigate your browser to the Web site. Next, determine the best way to find the help you're looking for. You can search the vast database of support articles, visit product-specific support sites, browse Microsoft's support newsgroups, or contact tech support online (you'll have to open a Passport account and may have to pay for this service). This sidebar focuses on the Knowledge Base of support articles, but you should check out the other available resources, as well.

When searching the Knowledge Base, first pick the product with which you need help. Most of the Search Topics are applications, but programming languages (such as Active Server Pages), hardware (such as the IntelliMouse), and general topics (such as Setup and Installation) are also covered. If your problem is general enough and your search terms specific enough, you can select All Microsoft Search Topics. But be prepared for a deluge of results. Next, type in some keywords that will identify your issue. These may include text from an error message, a summary of the problem you're having, or the name of a specific device or application that seems to be conflicting with a Microsoft product. Toggle the Show Options or Hide Options feature to further target your search and define parameters for the results. Don't get too specific too early; you might miss the information you're looking for. It's usually better to cast your net wide; you can easily sift through results or refine your search later.

Once you're comfortable with basic use of the Knowledge Base, you can begin to use more specialized tools. Use keywords to frame Boolean queries. A

Boolean query is simply a search that utilizes AND, OR, and NOT operators. For example, you might construct and enter a Boolean search for Setup and Installation by typing **cable OR dsl or (xp AND activation) AND NOT office**. In addition, several special characters help you further refine your search. Parentheses, as in the previous examples, help to organize keywords.

Enclosing keywords in quotation marks searches for an exact phrase, and including a wildcard asterisk (Intelli*) can broaden your search by finding anything that matches the defined part of your search. If you know the specific article you're searching for, you can simply enter its Q number (Q314070, for example) in the For Solutions Containing box and then selecting Search Only Article ID. ■

■ **It's No Joke.** Tech support types often joke about people who use their CD-ROMs as coffee holders and laugh at e-mail messages from users who don't understand why their computers won't work during a power outage. They even have code phrases for clueless end users: You may be having an "ID-10-T" error (try writing that one out) or a BKC (Between the Keyboard and the Chair) problem. At the same time, some technical support groups often develop a reputation for surly, shoddy service and an inability to actually solve problems. Miscommunication doesn't have to be the order of the day in technical support, however. A little knowledge and preparation on your end can help a great deal, saving time and frustration while simultaneously (and perhaps most importantly) keeping you from becoming a cartoon on somebody's cubicle wall. [E]

by Gregory Anderson

Free Computer Help

Where Can I Go To Find Free, Unbiased Help?

Suddenly you're getting an error message every time you try to log on to your computer. Or, you've upgraded to Windows XP and now your CD burner doesn't work. The frustration of needing to call technical support is enough to make you not want to do it. And when some support lines can cost several dollars a minute, don't you wish there were a way to find fast, free, unbiased help? Well, help may be on the way.

The Contenders. Several online communities are out there to answer that call for help without making you hold for 20 minutes or more. Most are free, staffed by volunteer "experts," and offer technical support through Web sites. Other sites offer friendly support from other registered members. And there are still more sites with plenty of thorough reference materials, although they may not offer hands-on help. We examined five sites to give you an inkling of what's out there.

Protonic.com. At <http://www.protonic.com>, you'll find a free support site staffed with "experts" who are ready to tackle even your most difficult questions or offer suggestions regarding your next upgrade choice. To register and ask a question, just click Ask A Question. The Login Wizard will guide you through the process.

Asking a question is easy. From your Client Homepage, type in a brief description of your question and click Go To The Question Wizard. In the Choose A Category area, click the category that best fits your question. You are then asked to rate your experience in that particular area. The next step is to provide your system information. (At this point, you can choose to have your system information saved for the next time you ask a question; check the Save This Information For Next Time box to do so.) Fill in your question title and a description of your question. Verify that the

system information is correct, attach any necessary examples (for example, error messages), and click Submit Your Question. A confirmation of your submission is sent almost immediately to your e-mail address. You can expect a response to your question within two to 24 hours. Protonic.com also offers a discussion



board; check there to see if your issue has already been discussed.

5 Star Support. The folks at <http://www.5starsupport.com> are also all volunteers. There is no registration process at 5 Star Support, although you can submit your e-mail address and click Subscribe to register for a free monthly newsletter. You'll receive instructions via e-mail about how to confirm your subscription.

To ask a question, click Free Technical Support and fill out the submission form. Once you submit your question, you'll receive a confirmation via e-mail stating that your question was sent to the 50 techs currently on staff and

that you can expect a response within two to 24 hours.

5 Star Support also offers several other features you may find useful. For tips, tricks, and tutorials, click the Technical Information drop-down box and a listing of several different topics appears. Select the one you are looking for more information on and you'll be provided with links to several types of reference material. Clicking the Resources link takes you to a table with several broad categories such as America Online and Virus Resources. Click one of these categories and a list of helpful topic links will appear. The Solution Center provides you with the opportunity to let everyone know how your problem was solved and

lets the techs know if they helped and what worked.

HelpOnTheNet. If an "expert" isn't exactly what you need, <http://www.helponthe.net>, a.k.a. <http://www.techguy.org>, may fill the bill. This site is designed to lend a helping hand by letting you post questions to a forum; other registered members will post replies to your questions. The help you receive here is also free.

If all you want to do is view questions and answers at HelpOnThe.net, you needn't register. If you want to post questions, however, begin the registration process by clicking Welcome! New Users Please Click Here. The Tech Support Guy Forums appear on the right side with a step-by-step registration wizard on the left side. The wizard provides detailed information on each step in the process. (Click Exit to close the wizard.) After accepting the terms and conditions of the site, you are taken to a registration form where you enter your pertinent information and select a username and password. Even though the site operates as a forum, it requires you to provide an e-mail address so the site can inform you of posts to your questions.

After you submit your registration, you'll receive a confirmation via e-mail. Now that you're ready to ask a question, click the category that best fits your question. Once the forum for that category appears, click New Thread and enter a subject. Now you can fill in your question and system information. When you're ready, click either Submit New Thread or Preview Post. (As the name suggests,

Preview Post lets you preview your post before submitting it.)

When someone submits a reply to your post, you will receive an e-mail message to let you know so. The e-mail message provides you with a link that goes directly to your post and asks that you visit your thread. (Note that you will not receive notification of any other replies unless you visit the thread.)

Computer Hope.com. The fourth site in our free tech support roundup, located at <http://www.computerhope.com>, is really a reference tool. The site offers free online computer support and information through an extensive database of reference material covering hardware and software. To access the information, click Free Help. Tables with alphabetized hyperlinks are displayed for hardware and software, and there is also a table with links to manufacturers' device driver download pages. Computer Hope.com offers many helpful sections, including an online dictionary, cleaning and buying tips, and a free monthly newsletter. A listing of computer-related Web sites is also available. And to further quench your thirst for knowledge, the site provides a listing of available products including software, hardware, and books. Even though the folks at Computer Hope.com prefer that you locate your information in the database, it's possible to submit a question through the Technical Support Inquiry page. However, there's no guarantee you will receive a response.

Microsoft Knowledge Base. One of the first places a computer user should look when experiencing technical difficulties is the Microsoft Knowledge Base at <http://www.microsoft.com>. The Knowledge Base is full of informative articles, it's free, and it's easy to use. Using the Search function, select the category of articles that best fits your question. Next, enter keywords or phrases. If you'd like to make your search more specific, click Show Options so you can enter more search criteria. Once you've chosen your search criteria, click Search Now; the results will appear on the right side of the screen.

The Challenge. To get a better idea of how these sites handle problems, we submitted two questions each to Protonic.com, 5 Star Support.com, and HelpOnThe.net. We also searched for reference materials pertaining to the two questions on Computer Hope.com and the Microsoft Knowledge Base. Our initial goal was simply to get a response. We then looked at how quickly each site responded and at the quality of the answers or suggestions.

The (hypothetical) problems. The first question we asked posed a "problem" with a

worth a try asking. We own a Ricoh digital camera and once we upgraded to Windows XP, we are no longer able to download pictures from the camera to the computer. We downloaded the appropriate drivers and still have no success. Any suggestions would be greatly appreciated."

And some solutions. Maybe. We already knew the answer to the first question: Unnecessary items had somehow been added to the System Registry that needed to be deleted. We were curious to see if any of the techs

would come up with a solution. Within two hours, Protonic.com sent a request for more information; they wanted to know what the manufacturers had us do. We submitted the additional information, but after three more days we had received no response.

From 5 Star Support we received a confirmation of our question being submitted within one hour. The confirmation stated that our question had been forwarded to the 50 technicians on staff and that we could expect a response within 24 hours. After four days, we had received no response.

HelpOnThe.net was much more helpful, or at least more active; within one hour, two members had submitted replies to our post. A few hours later, two other members submitted suggestions. Because our problem had already been resolved, we were unable to test their suggestions. And because none of their suggestions dealt with the System Registry, we doubt they would've fixed our problem.

At Computer Hope.com, we selected Lexmark Printer from the Hardware table. Even though we didn't find an answer to our question, general information, debugging routines, and troubleshooting help were available. We then searched the Microsoft Knowledge Base. Our search produced ten articles, but none related to our problem.

Six days after posting our original question, we posted our solution to each of the three sites.

The second question garnered a better response. Within four hours, Protonic.com submitted a request for more information,

The screenshot shows the Protonic.com website. On the left is a navigation menu with links like 'Your Account', 'Client Homepage', 'Question History', 'Ask A Question', 'Make A Suggestion', 'About Protonic.com', 'Discussion Board', 'Award Gallery', 'Become A Tech', 'Bookstore', 'Contact', 'FAQ', 'Link To Us', 'Tell A Friend', 'Ordercenter', 'Privacy Policy', 'Site Map', 'Full Graphics', and 'Login/Register'. The main content area is titled 'Ask A Question: Your Question' and contains a form with fields for 'Name', 'Email', and 'Subject'. Below the form is a 'Long Description:' section with a text area. At the bottom, there is a checkbox for 'Please check the information below. Make sure it is correct for this computer (You will be able to submit your question at the bottom of this page.)' and a 'Submit' button.

Asking a question at Protonic.com is as easy as filling out the provided form.

The screenshot shows the 5 Star Support website. At the top, it says '5 STAR SUPPORT' and 'March 2002 Issue'. Below that, it says 'Below, find our current issue of the 5 Star Support Monthly Newsletter'. There is a 'Subscribe below' section with a text input field for 'Please enter your email address:' and a 'Subscribe' button. At the bottom, there is a section for '5 Star Store' with links to 'T-Shirts', 'Hats', 'Pens', and 'Coffee Mugs'.

5 Star Support also offers a free monthly newsletter. Be sure to check your e-mail because you must respond to the confirmation request in order to finalize your subscription.

popular printer. We submitted the following: "We recently purchased a Gateway 500SE with Windows XP and a Lexmark X73 multifunction printer. The first few days the printer worked just fine and then it just completely stopped working. We checked to make sure all cables were plugged in, downloaded the Windows XP driver from the Lexmark site, uninstalled and reinstalled both the printer software and Windows XP, called Gateway and Lexmark, and still no luck." The second question we asked was this: "I'm not sure if you help with digital camera problems, but it's

specifically, the model number of the camera. We supplied the information and the tech was able to determine that the Ricoh model we have is not yet supported in Windows XP but that an updated driver is forthcoming. The tech suggested that we use the Windows 2000 drivers, but that was unsuccessful.

Once again, 5 Star Support sent a confirmation that our question had been received and submitted to the techs. Within two hours, we received an e-mail from a 5 Star Support tech with a request for more information: the camera model. After getting the camera model, the tech responded back with the Win2000 driver files attached for us to try, and some documentation was included, as well. Another tech responded with the same information that not all cameras are supported yet. They suggested we dual boot our system with Windows 98.

After five hours, the same request for more information was posted in response to our question at HelpOnThe.net. We supplied the camera model and, within 10 minutes, another member posted a reply with a suggestion that had already been tried unsuccessfully. When we checked the hardware table at Computer Hope.com, we found no information about the Ricoh. (Then again, we doubt the site is meant to support digital cameras.)

Our Microsoft Knowledge Base search resulted in 16 articles, including one with a list of digital cameras that work with Windows

We found that Windows XP did not yet support this Ricoh camera but that an updated driver was forthcoming.



XP. To our dismay, Ricoh wasn't on the list. And because we already knew of other Ricoh models XP supports, we concluded that this wasn't a comprehensive list of all cameras.

■ The Winners. When it comes to picking a winner, we must first look to see if we achieved our goals. We did receive *some* type of timely response to both questions from all the sites. All respondents were polite and friendly, and none made us feel as though we were asking a "stupid" question. We found that all respondents provided very similar suggestions and answers.

For the first question, we would have to say that HelpOnThe.net was most helpful, considering that the other two sites never offered a suggestion or answer. But on the second question, we give the gold medal to both 5 Star Support and Protonic.com. With the help of these techs, we were able to find out that Windows XP did not yet support our camera. Although the suggested workaround was unsuccessful, the idea indicated that someone had been thinking about the problem on our behalf. (And, in fact, using a Win2000 driver when an XP driver is unavailable is a fairly common and often successful strategy.) For now, we'll just have to wait for that WinXP driver.

■ The Finish Line. So what does this mean for you the next time you get the tech support blues? No longer do you have to sit on hold for 20 minutes or more waiting for help. If you take the time to register with these sites, you gain access to a collective group of people who really want to help. We can't guarantee they'll solve your problem, but they'll certainly try. And the price is right. **LE**

by Dana Montoye

Newsworthy Help

Newsgroups are another form of online community providing help to computer users. Participants post messages others can read and respond to at any time. Messages are posted in sequential order. To learn more about how newsgroups work, we subscribed to the Windows XP newsgroups through Outlook Express.

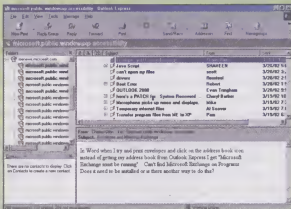
To subscribe to a newsgroup through Outlook Express, click Accounts from the Tools menu. In the Internet Accounts dialog box, click Add, then News. When the Internet Connection Wizard appears, follow the instructions to establish a connection with a news server. If you are using a program other than Outlook Express, follow the instructions for your product to subscribe to newsgroups.

Once we finished subscribing, msnews.microsoft.com appeared as an Outlook Express folder. By expanding the folder, we were able to view several

categories of XP-related newsgroups. We found that as many as 27 different newsgroups exist under the Windows XP umbrella, including groups covering accessibility, basics, configuration management, even games. Newsgroups with unread posts appear bolded.

responses appear with a plus sign (+) next to the subject line. Click the plus sign (+) to display the subject line of the reply. More than one reply can be sent to a post.

Newsgroups can be a good source of information about almost all aspects of a wide variety of topics. If you want to learn more



Newsgroups are another way to look for help. Newsgroup communications look just like e-mail messages, with users posting their messages and other members posting replies.

We selected a bolded newsgroup and found that each post appears much like an e-mail message with a subject line. Posts with

about something or find out what's going on with other users, newsgroups are definitely a convenient and helpful tool. **□**

Remote Tech Support

Take Advantage Of Online System Scans & Utilities



If you use Microsoft Windows, you're familiar with the helpful messages you occasionally get (always at the worst possible moment) that inform you that everything has just gone belly up. In the older Windows products, these were called GPFs, an abbreviation that stood for General Protection Fault and explained absolutely nothing. Thankfully, Microsoft decided to clarify the issue by renaming them UAEs (Unrecoverable Application Errors) in later versions. That made us all feel so much better.

If (well, when) you do run into a problem, your options for getting it fixed are fairly limited. Unless you're an employee of a generous corporation that doesn't mind its IT people making house calls, your best bet is to call your brother (or niece, or neighbor, or friend) the computer geek and beg and plead for him or her to come and fix your machine. At least,

that's the way it used to be. Now, with nothing more than a modem and an Internet account, you can gain access to online utilities that scan your system, evaluate your problem, recommend a solution, and give you a person to call if needed, all at a price that doesn't require you to take out a second mortgage. You can also gain access to a plethora of other online services that will scan your system for viruses or help you fine-tune its performance. "Too good to be true," you say? Read on. We've got some good news for you.

■ **Online Tech Support.** You'd probably get a little nervous if somebody asked to remotely access your computer, especially if that someone is a person you've never met who lives 2,000 miles away. Normally, this hesitation is natural and good, but when it comes to fixing your computer, we encourage

you to overcome your fears and explore the new world of online tech support.

New possibilities. Thanks to a new breed of online tech support companies, you can now gain access to a whole host of high-end diagnostic and repair services without leaving your chair. These include such things as remote virus scanning, performance diagnostics, and hardware/software troubleshooting and repair. Take care, though; each service provides something a little different. Some run a complex set of diagnostic tests on your machine to evaluate its overall health, but they leave the repair of any problems they find up to you. Some don't test for nonfunctioning hardware or software. Some offer only remote virus scanning services that you can access from your Web browser and ignore other issues. We'll cover some of these companies and go over the specific services they offer.

A little healthy skepticism. If you're skeptical of these sorts of services, you're not alone; many people are doubtful that an online scanning robot can provide the same level of service as a qualified on-site computer technician. This new breed of online support, however, is nothing like your traditional customer service center. First and foremost, the scanning utilities used by these services represent the collective knowledge of hundreds of highly intelligent techie types. The utilities act as the eyes and ears of the service, looking inside your machine and faithfully reporting back what they see to the main system on the provider's site. Using a service such as this is like having 100 service people come to your house to fix your system, all armed with the latest knowledge of your computer.

Aided by these utilities, services such as PC Pinpoint can remotely diagnose and repair over 65% of common problems without cracking the cover of your machine. For those they can't repair, their utilities can reduce the time it takes a technician to repair your machine by 75%. The performance diagnostics these systems provide are equally good; they can uncover anything from an undersized cache (a temporary storage spot for information) to areas that represent a possible security risk. Utilities like these are nothing new, of course, but making them available online and providing a real live person if you need one has made them much more effective.

■ **The Online Advantage.** Since the beginning of personal computer time (circa 1983), there have always been utilities you could

purchase that would scan for problems on your computer. Early on, all of these ran locally; you loaded them on your machine like any other software package and then ran them when you wanted to repair something. Some of these, such as Norton Utilities, achieved almost cult status among the tech crowd. With varying degrees of success, these products would evaluate problems on your computer and suggest fixes. Of course, these utilities have never succeeded in making a qualified repairperson obsolete, primarily because automated utilities can only find and fix a subset of all computer problems. Computers by their very nature are complex things, and the number of things that can go wrong is staggering. So, if you've exhausted all the options suggested by your repair utility, you may still have to call someone and pay the going rate. Online services, however, have several distinct advantages over locally installed products.

Timely information. An online service gives you access to a constantly expanding database of solutions, significantly improving the odds of identifying and solving your problem. A local problem-solving utility always lags behind on the latest information. To overcome this, some locally installed products have implemented "live update" features that automatically download the latest information, but you'll have to make sure you download and install the updates; one day's delay could mean that you're lacking some important piece of information.

Access to an actual human. If the automated system can't find your problem, some of the services, such as PC Pinpoint, provide a live tech support person to help continue the chase. This person can remotely access your computer (with your approval, of course) and look for anything out of the ordinary. And because he has access to the data from the automatic problem scan, he won't waste time by asking questions to which he already has the answers or trying things that have already been ruled out.

Subscriptions and guarantees. In some cases, you have the option of purchasing either a yearly subscription to the scanning service or a shorter subscription geared toward solving one problem. PC Pinpoint, for example, guarantees that they'll fix your problem or you don't pay. If you purchase a locally installed utility, you pay no matter what.

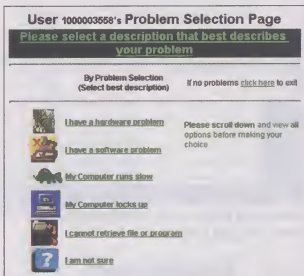
■ **An Important Disadvantage.** One major disadvantage to running online scans is so obvious that it's bound to be overlooked: You need a working Internet connection. So what happens when the problem you want to diagnose and fix is your Internet connection? In many cases, you'll have to fix the problem before you can run a scan. Some services include offline tools to help diagnose connection

of your system that the main application will check against a database of known problems, viruses, or parameters. With system diagnostic and performance scanners like PC Pinpoint, the client focuses on gathering information regarding system parameters such as memory usage, security settings, disk fragmentation, and Internet connection performance. When complete, the service will display your machine's score, along with any suggested changes or modifications. In many cases, you can run a script from the service that will make the suggested changes, or you can make the changes yourself by following the included instructions. If you like, the service will store your information in a database for you to access later and compare against future scans.

With tech support and problem resolution scanners like PC Pinpoint, the focus of the effort is much different. According to Bob Wing, CEO of PC Pinpoint, its service is geared toward fixing problems. "If you're visiting us," he says, "you probably already know what the performance of your machine is." PC Pinpoint's client spawns a set of scripts that perform functional tests on various parts of the computer. These

test scripts act as little robotic data-gatherers, peering into the deepest recesses of your system looking for everything from out-of-date drivers to I/O (input/output) conflicts. Whatever these little robots find they faithfully report back to the mother ship. This information is then analyzed by the main system and a course of action is prescribed. In many cases, fixes are applied automatically. If the problem can't be fixed automatically, the service provides a set of instructions for you to follow to continue the repair, ordered from the most likely to the least likely solution. If you're concerned about being left on your own, you needn't be; they also provide a tech support person via real-time chat, e-mail, or telephone. This person will stick with you throughout the repair process and help get you going again.

■ **Is It Safe?** In this day and age of computer viruses, worms, and identity theft, nobody can be blamed for wondering whether these online system scanners are safe. Whenever you let something run on your machine, it's well worth the time to find out beforehand what it does with the data. What do they know about you? How is whatever they know transmitted?



PC Pinpoint lets you drill down into your specific hardware, software, or connection problem.

problems in the event that you can't get to their service. (If you're using Windows XP, this may be less of a problem because XP ships with the Network Connection Wizard, a very capable Internet connection and diagnostic tool.) If you're not using a service that can diagnose your system offline and you can't get your connection working, you'll have to either call your brother, Ernie, or pay for a service call by a technician.

■ **How Does It Work?** Although each system is unique, most online system scanners operate by downloading and installing a small application on your machine when you sign up for the service. In order to use the service, you have to place a lot of trust in this software, because it has complete access to your machine. We therefore suggest that you carefully select your online scanning service; you certainly don't want just anybody's program running around inside your machine. Just choose a utility with a good reputation and you'll be fine.

Once loaded on your machine, the client application goes about its business, testing and gathering information about the various parts

Where does it go? To the credit of the diagnostic and scanning companies, they all appear to have taken great pains to make sure your system isn't compromised by their service. Although they all work a little differently, they share a common concern for your data and your privacy.

Personal data. None of the services we looked at examined or saved your personal data. Remote scans are limited to things such as the System Registry, device drivers, and system hardware.

Changes. None of the system scanners we checked made any changes without your approval. The initial scans and diagnostics stick to evaluating your system and reporting back what they find. When a change is suggested, the user has the option of rejecting or accepting it. This holds true for the virus-scanning services as well; if a virus is found, the user is notified and given a choice of actions.

Data security. When machine-specific data is sent to the main system, it is not sent with any unique identifiers that are traceable to your machine. Some providers, such as PC Pinpoint, actually encrypt your data before transmitting.

■ **What's Available.** When it comes to finding online support services, the choices are still fairly limited for the home user, although this is likely to change over the next few years. Some services are marketed exclusively to corporate IT departments who are seeking to reduce their support costs. Here's a rundown of what's available.

PC Pitstop. This service (at <http://www.pcpitstop.com>) has been around for a little over two years. It does an admirable job of benchmarking and helping you tune up your system. You can run an extensive array of diagnostics and get a nice graphical report of your system's performance and security. The basic service is free, and you can run it anonymously if you wish (although you won't be able to store your data for later review). If you still have issues that you can't resolve, you can pay \$9.95 per incident for e-mail support or \$19.95 for phone support (per incident, with no per-minute fees).

PC Support.com. This Web-deployed service (see <http://corporate.pcsupport.com>) is focused mainly on the corporate market. If you have a small company and don't want to hire support staff, this may be a good bet. The ser-

vice is a combination of live support operators, Web-based utilities, and self-help services. The company claims to be able to solve 85% of problems on the first contact.

Triage. This is a system offered by MetaQuest. As with PC Support, the Triage system is marketed exclusively to corporate IT folks. If your company is in the market, visit <http://www.metaquest.com>.

PC Pitstop does extensive performance diagnostics and gives an exhaustive report of what it finds.

The screenshot shows a detailed system report with sections for 'Top Tips for DESKTOP', 'Subsystem Description', and 'Performance Configuration'. It lists various system components like BIOS, Memory, Disk, and CPU, along with their specifications and status.

PC Pinpoint does extensive performance diagnostics and gives an exhaustive report of what it finds.

The screenshot shows a detailed system report with sections for 'Top Tips for DESKTOP', 'Subsystem Description', and 'Performance Configuration'. It lists various system components like BIOS, Memory, Disk, and CPU, along with their specifications and status.

When PC Pitstop finds a problem, the service gives tips like this one to help you correct it.

PC Pinpoint. A service of Distinctive Technologies, this is by far the most exhaustive online diagnostic site and the only one we could find that guarantees your problem will be fixed. (See them at <http://www.pcpinpoint.com>.) The folks at PC Pinpoint have targeted the home user with a flexible and user-friendly service. For \$14.95, you can use their service for a week to fix one problem, or you can pay them \$49.95 for a full year's access. There are no additional fees if you require a live support person, and no limitations on the number of times you can use the service within your subscription period. For our money, this is the best thing going.

VirusScan Online. If all you want is virus-scanning services, McAfee.com offers its award-winning VirusScan product as an online

service. Using this service, you won't have to worry about having the most up-to-date virus definitions or installing anything on your system. Cost is \$49.90 for two years' worth of protection, which is well worth it when you consider the cost of being infected by just one virus. See <http://www.mcafee.com/myapps/vso>.

Web1. This product works in conjunction with LiveRepair.com's (see <http://www.liverepair.com>) subscription-based technical support. Web1 simplifies the support event by gathering information about your machine and performing some diagnostics before you call LiveRepair. It also lets the support technician share screens (so they can see what you're seeing) and has a nice Internet connection troubleshooter. A subscription to LiveRepair's service is \$99 per year.

First Aid Online. A popular part of McAfee.com's suite of online services, First Aid Online (located at <http://www.mcafee.com/myapps/fao>) is a performance diagnostic tool that will help you tune up your machine. It includes a system information generator that creates an exhaustive report on your system. You're responsible for repairing anything you find, but it does offer an online knowledgebase that is designed to help you solve common problems.

As of this writing, First Aid Online is available for Windows 95/98/Me but not for WinXP/NT/2000. The service costs \$19.95 for a 1-year subscription.

■ **Rely On The Pros.** With services like these, you can finally get access to top-quality diagnostics, support, repair, and virus protection for your home PC. Not that your Uncle Ernie or your sister the tech whiz aren't well-intentioned, but let's face it: Their ability to fix today's complex systems is limited. They simply don't have all the information they would need to stay up to date on all the different operating systems, peripherals, software, and connectivity issues. With online tech support, you'll be able to deal more effectively with PC-related crises. And you won't have to put up with those little annoyances that acted as constant irritants but which, before you found your online helper, were too minor to bother with. [E]

by Ronald Hockett

Disappearing Operating Systems

What To Do When Your Windows XP Activation Period Runs Out

So you've finally decided to jump on the Windows XP bandwagon and give Microsoft's newest OS (operating system) a whirl, but you still haven't activated it. Maybe you haven't quite decided if you like WinXP, or perhaps you think that the activation process is going to be long and painful. It's best to make a decision before the grace period runs out, so we're going to tell you what will happen if you don't activate and show you how simple the process is.



For specific instructions on how to boot into Safe Mode, refer to your users manual. Methods vary, depending on your system. (Most systems require that you press the F8 key while starting the computer.) Once you've successfully entered Safe Mode, the system will notify you that Windows is running in Safe Mode; click OK or Yes. The words "Safe Mode" will appear in all four corners of the screen. Go to the Control Panel and use Add/Remove Programs to uninstall WinXP.

■ To Expire Or Not To Expire. If you've upgraded to WinXP from Windows 98, 98 SE, or Me using the Upgrade option but haven't yet activated WinXP, your previous OS is retained. If you decide you don't want WinXP and you're still within the grace period, you can go back to your previous OS and delete WinXP through the Add/Remove Programs function in the Control Panel. But if your previous OS was Windows 95 or Windows 2000, or if you did a New Installation (as opposed to an Upgrade Installation, and regardless of your previous OS), it's important to understand that once you install WinXP, there is no going back to your previous OS.

But what if the grace period has expired? Once the grace period is over, you're required to activate. If you don't, you're logged out and unable to use the OS. To log in to your computer and return to your previous OS, you'll have to do so by booting into Safe Mode. (See below.) Remember, though, you can only go back to your previous OS if you completed an Upgrade install to WinXP from Win98, 98 SE, or Me. Bottom line? Anyone who performed a New Install or who upgraded from Win95 or Win2000 cannot return to their previous OS.

■ Easy Activation. You've made your decision: You really, really like WinXP and you want it. The activation process is fast, easy, and painless. Every time you log on to your system prior to activating, the Microsoft Activation Wizard appears, giving you the option of activating via the Internet or over the phone. We used both methods. Each worked flawlessly and, even though activating via the Internet was faster than using the phone, the phone call still took less than 10 minutes.

Internet Activation. The first step in activating over the Internet is choosing a country or region. (This screen also asks for your personal information, but this is optional.) Click Next and in less than a minute you're notified that activation is complete.

Telephone Activation. To activate WinXP via telephone, first select your location; a toll-free telephone number will be displayed onscreen. Using the keypad on a touch-tone phone, enter the Installation ID that appears onscreen. In a few moments, the automated telephone prompt will relay the Confirmation ID for you to enter in the boxes provided on the screen.

■ Stay On Or Get Off. Not everyone is going to like the XP bandwagon, of course, and Microsoft has made it fairly easy to jump on and off. Depending on your previous OS, and whether you chose the New Installation or the Upgrade Installation, you may be able to gracefully uninstall WinXP. And if you decide to keep on riding, the activation process won't even be a bump in the road. **[S]**

by Dana Montey

What Did I Do To XP?

You're sailing along, enjoying Windows XP, but you decide to make some system modifications. Be aware that there are some instances in which you may be required to reactivate WinXP after making changes to your computer. WinXP verifies the same 10 components at every startup. You're allowed to change six of those components within a 120-day period without reactivating. If a seventh change is made within the same 120-day period, you'll have to reactivate. (Every 120 days, the system resets to zero.) According to Microsoft, the system checks the following 10 hardware components:

1. Display adapter
2. SCSI (Small Computer System Interface) adapter
3. IDE (Integrated Drive Electronics) adapter
4. Network adapter MAC (Message Authentication Code) address
5. RAM amount range
6. Processor type
7. Processor serial number
8. Hard drive
9. Hard drive volume serial number
10. CD-ROM/CD-RW (CD-rewritable)/DVD-ROM

So if you change any seven of these within a 120-day period, you'll probably have to reactivate your OS.

Note, however, that if your machine came with Windows XP preinstalled and you were never required to activate the software, the computer manufacturer may have set it up so that unlimited hardware changes can be made without ever triggering reactivation. **[□]**

Lose Your Keys?

How To Work With Windows Passwords

In many of today's homes, the PC has become a valuable family resource. Dad uses it to track stock prices, Mom uses it to research health and nutrition questions, and the kids use it to do homework. They all want the PC to act as their *own* personal computer by remembering their favorite wallpaper, screen saver, and Desktop layout.

To maintain these individual preferences, you must create a separate user account for each family member. These user accounts are protected by individual passwords to ensure privacy, but what happens when one of these passwords gets forgotten or accidentally changed to an unknown value? A little knowledge and planning can save you a lot of grief if a password problem makes a user's account inaccessible.

■ **The Way It Was.** The concept of multiple users with private passwords was first introduced in Windows for Workgroups to support early peer-to-peer networking. Windows 95 tied individual preferences and Desktop settings to the username, and it worked so well (aside from security reasons) that the resulting scheme remained virtually unchanged through Windows 98 and Windows Me. These OSes (operating systems) only display the logon screen if your computer is networked or set up for multiple users.

When multiuser settings are enabled, Windows OS uses the username to determine which set of personal preferences and Desktop settings it needs to load. If your computer is networked, the username and password you enter, in effect, become your credentials when you attempt to access any shared resources on the network. If you forget or corrupt this password, you could be denied access to shared files, printers, and other network resources, but it is still possible to gain access to the PC and its local resources, as we shall see later.



■ **Out With The Old, In With The New.** Windows XP provides computer users with a much more secure environment in which to work. User accounts are mandatory, and case-sensitive passwords are strictly enforced.

The Win9x/Me OSes do not provide any file security for local users. Regardless of which username you select, you will have full access to all the files on the PC's hard drive.

In contrast, WinXP utilizes three types of user accounts that provide different capabilities and file-access rights: Administrator, Limited, and Guest. Only a user with system administrator capabilities is allowed to perform certain functions, such as creating new user accounts and updating system files.

Another difference between WinXP and its predecessors is the way in which passwords are stored. WinXP stores all user information in binary, encrypted system files that are not accessible to the user. The earlier OSes store their password information in separate files, one for each user. These files are named *Username.pwl*, and they are stored in the default Windows folder.

■ Protect Your WinXP Passwords.

WinXP provides a utility to help you recover your user account and personalized computer settings if you forget your password. If you created a password reset floppy diskette for your local user account through the Forgotten Password Wizard, you can use this diskette to gain access to the computer, even if you have forgotten your password.

It is important to note that you must have created the password reset diskette *prior* to forgetting your password. If you have multiple user accounts, each local user must create a separate diskette. If you are the system administrator and elect to perform this function on behalf of the users, you will still need a separate diskette for each account because the wizard stores the recovery data on the diskette in a file named *Userkey.psw* and the wizard does not let you override this name.

In WinXP, the password reset diskette, also referred to as the password recovery diskette, is the only safe way to correct a forgotten password issue. It is possible to log on as the system administrator and reset another user's password, but Microsoft warns that the user may lose access to his Web page credentials, file-share credentials, encrypted files, and private-key certificates, such as digital signatures. For more information on how to recover these items, search for support document Q290260 at Microsoft's Knowledge Base, <http://support.microsoft.com>.

If you have previously created a password reset diskette, the process of regaining access to your computer is quite simple. At the WinXP Welcome screen, click your username and type in a password. If the password you enter is incorrect, the Did You Forget Your Password? message is displayed.

Click Use Your Password Reset Disk to start the Password Reset Wizard and follow the instructions to create a new password. Once you have regained access to your computer, store your password reset diskette in a safe place. It is not necessary to create a new diskette even though your current password may differ from the one you were using at the time you created the diskette.

■ Recover Win9x/Me User Accounts.

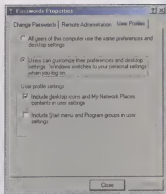
The Win9x/Me OSes don't provide wizards for helping you safeguard your logon passwords

so you must devise a system of your own. If you carry a personal planner, either paper or electronic, consider recording passwords there. If you still manage to lose your logon password, click the Cancel button on the logon screen and wait until the Desktop loads. As mentioned earlier, you can still access all the files on the hard drive, even though you are logged on as an anonymous user and failed to provide a password because the Win9x/Me OSes don't provide any protection from access by other local users.

To correct a forgotten password problem, open Windows Explorer (right-click the Start button and select Explore) and navigate to the folder where Windows is installed. This is normally C:\WINDOWS, but it could be different on your computer, especially if you are using a dual-boot configuration. In this folder, locate and delete the PWL file with a name that matches the lost password account. For example, if Marty lost his password, you would delete Marty.pwl from the Windows folder. Close the Explorer, click the Start button, and click Log Off.

When the logon screen reappears, enter the username, enter a new password, and click OK. Because there is no PWL file for this user, Windows will ask you to confirm the new password. Enter the password again and click OK to create a PWL file that contains the new password. This procedure ensures that all of the user's original preferences and Desktop settings remain intact, but you may still have to resolve issues with network resources, especially servers, if you are using the Client for Microsoft Networks.

■ Connect To Other Network Resources. Up to this point, we have only discussed those passwords necessary to gain access to your local PC, but in a typical day, you may be required to provide numerous other username and password combinations. These credentials, as Microsoft calls them, are used to access other computers on networks and over the Internet. For example, if you are working at home, you may need to use your work



All users of a single computer, by default, share the same preferences and Desktop settings. To customize the Desktop for Windows 9x/Me users, open the Control Panel, open Passwords, and select the User Profiles tab. Click the Users Can Customize Their Preferences radio button and click OK.

username and password when you connect to work-related servers.

WinXP includes a new feature called Stored Names And Passwords that lets you store multiple sets of credentials, along with the server, workgroup, or network location they apply to, as part of your personal profile. When you connect to one of these resources, WinXP automatically supplies the correct credentials. This process is much more cumbersome in Win9x/Me and often requires a configuration change followed by a system restart. Because Win9x/Me has no provision for storing these alternate usernames and passwords,

they must be written down or remembered and may become lost or forgotten.

You can also use the Stored Names And Passwords feature to provide credentials to secure Web servers, such as stock trading sites. Because the credentials are stored as part of your profile, other users of your shared PC won't be able to access these resources unless they provide their own credentials.

■ Manage Dial-up Connections.

When you create dial-up connections with the Dial-Up Networking applet in the Win9x/Me Control Panel, these connections are available to anyone who uses the computer. If you want to prevent the unauthorized use of a connection, you can choose not to save the password, but then you have to remember it and enter it every time you use the connection. If these passwords are forgotten, you are probably faced with a call to the dial-up service provider and a long wait in the on-hold queue.

WinXP provides two types of dial-up connection: global and private. If you are logged on to a user account, you can only create private connections, and they are visible only to

you. If you are logged on to an administrator account, you can create either global or private connections. Global connections are visible to anyone using the computer, regardless of the type of account they logged on to.

A private connection may include stored credentials, which are transmitted automatically when the connection is used. If the credentials are not stored, the user will be prompted for a username and password each time the connection is used.

A global connection may include credentials that are either stored for all users or stored for the creator only. If the credentials are not stored, or if the user is not authorized to use the credentials, the user will be prompted for a username and password each time the connection is used.

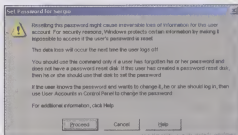
■ Password Software. Even with all the new tools available in WinXP, you will still have passwords to remember, and fortunately, a number of good shareware programs help with the management chores.

Password Agent from Moon Software (<http://www.moonsoftware.com>) stores your usernames and passwords in a data file using a 256-bit Blowfish encryption algorithm. The program is also password protected so other users can't gain access to the file.

Password Agent includes a handy generator that creates hard-to-guess passwords from three to 40 characters long. Most users have resisted these strong passwords because they are hard to remember, but that may change with the assistance of WinXP's new tools. Password Agent Lite is available as a free download and can store up to 25 passwords. An unlimited version of the program is available for \$14.95.

■ Typographic Memory. WinXP features, such as the Forgotten Password Wizard, will make your multiuser home computer a much friendlier and safer place to work and play. But it won't add any more hours to the day. Unfortunately, allocating online time to family members remains a manual task. **[E]**

by Dick Archer



Windows XP includes an administrative tool for resetting a user's forgotten password, but this option should only be used as a last resort.

From Point A To Point B

Don't Let Dial-Up Slow You Down

The 56Kbps (kilobits per second) modem is alive and kicking. Despite the popularity of broadband, dial-up users still outnumber high-speed users three to one. If you are one of the people sitting through beeps, screeches, and delays when trying to view Web pages, consider the following adjustments to improve performance and enhance connectivity.

■ **Improve Connectivity.** Many dial-up users do not realize that even though a modem is advertised as a 56Kbps modem, it is virtually impossible to connect at 56Kbps. Government regulation states the maximum download speed allowed is 53Kbps; the maximum upload speed is 33.6Kbps. Because of this, 56Kbps refers to the potential speed the modem would operate at without regulation. Many other factors affect the connection speed, including the quality of the modem itself and imperfections of the phone line.

A common question people who have connectivity problems pose is whether tweaking the configuration settings will help. The answer is, it depends. There are a couple of useful areas to investigate. However, be warned that no sure-fire method will work for every user, and some solutions have negative consequences if performed incorrectly.

Configuration. Over the years, Microsoft has worked to reduce the number of steps required for a user to connect a modem. For those who struggled with Windows 95 where modem settings had to be entered manually, the configuration for Windows 98/Me/XP has been considerably refined. Fewer steps are involved and the introduction of the Internet Connection Wizard aims to simplify the process still further.

To access the Internet Connection Wizard, click the Start button, select Programs, then Accessories, and then Communications. Once there, the user can set up a new Internet account, transfer an existing Internet account, or manually set the connection. In WinXP, the

Internet Connection Wizard has been renamed New Connection Wizard. To access it, click Start, Connect To, and Show All Connections. Then choose Create A New Connection from the Network Tasks in the left panel.

The Internet Connection Wizard will automatically determine the optimum settings for configuring your modem with all three OSes (operating systems). Similarly, the TCP/IP (Transmission Control Protocol/Internet Protocol) settings, "are basically self-tuning, and while it is possible to manually configure settings, Microsoft does not recommend doing this," says Mike Coleman, Microsoft WinXP's product manager.

■ **IRQ Conflicts.** There are potential compatibility problems with PCI (Peripheral Component Interconnect) modems. PCI is the modern standard interface for add-on cards that slot into your PC's motherboard. A device such as a modem requires a communication channel to the computer's processor. This is accomplished through an IRQ (interrupt request line). An IRQ momentarily interrupts the processor's current task to relay information. In a PnP (Plug-and-Play) environment, the IRQ is automatically set when the device is installed. If two or more devices share the same IRQ setting, a conflict may arise that could degrade your modem's performance.

Change the IRQ settings for one of the conflicted devices or move one of the devices to another PCI slot, which changes the IRQ assignment, to resolve an IRQ conflict in your system. Moving the modem to a new PCI slot will not require any additional steps in any of the OSes, says Coleman. All versions of Windows will recognize the change automatically.

■ **Port Speed.** Port speed is the speed at which the modem sends data to the computer.

Because modems can also compress data (as much as two times and, in some cases, more), a typical 56Kbps modem connection of 48,000bps (bits per second) can result in data rates of 100,000bps. However, if the port speed is set to a rate lower than the compressed data rate, the port speed becomes the bottleneck in the connection. Setting the port speed to 115,200bps can therefore improve connection speed. Port speed only affects hardware-controller based modems (not Winmodems) and usually is set correctly when the modem is installed.

The potential downside to changing the port speed occurs if it is set higher than the modem or hardware supports. Although all recent modems will support a 115,200bps port speed, older modems sometimes set it lower.

To determine what your port speed is set at in Win98/Me, and to alter it if necessary, click Start, select Settings, select Control Panel, and open System. Click the Device Manager tab and click the Ports (COM & LPT) plus sign (+). Select the port your modem uses, click Properties, click the Port Settings tab, and set the bps (bits per second) to 115,200bps, the maximum setting for a standard COM port.

In WinXP, the port speed can be accessed by clicking Start, Settings, Control Panel, and Printers And Other Hardware. Click Phone And Modem Options. Click the Modems tab. Double-click the name of the modem you are working with. Click the Modem tab on the modem Properties page. The Maximum Port Speed is in the middle of the page.



■ **Lower The Modem Speed.** One-upmanship among competing modem manufacturers has led to products making a connection at a rate faster than the line conditions can actually support. This can result in problems such as not being able to connect at all (failure to handshake or authenticate), long pauses, and disconnections. A widely implemented solution is to slow down the modem's maximum connection speed. What is important is the **throughput**, the rate that the data is transferred, *not* the connection speed reported by the modem, which can be very misleading.

The ratio of speed to reliability needs to be finely tuned. "Sometimes you only need to slow down slightly to get an acceptable reliability, sometimes you have to drop back dramatically," explains Jacob Walker, a former lead technician for Psyberware Communications and publisher of modem-information site, <http://www.tetrakatus.com/modems>. He recommends starting with a large change in modem speed and working your way back up to get a reliable speed result first.

For example, "If you are disconnecting at 48,000[bps], then set the modem back to 40,000, and if that works, switch to 44,000. If you do not get above 33.6K[bps] speeds, then set the modem back to 21,600 or 24,000, but generally [don't go] below this."

■ **Winmodems.** Winmodems cost less to manufacture so many computer suppliers include Winmodems with their computers to save money. Whereas hardware-controller based modems, or hard modems, draw from fixed resources, Winmodems, or soft modems, are software-based modems that require varying levels of resource commitment based on a number of variables, including the particular design of the Winmodem itself and its driver.

In general, a hard modem will perform better than a

Winmodem because it is not competing for your computer's precious processing power. Winmodems are also particularly susceptible to poor phone line quality. Some of the known problems with Winmodems include random disconnects, slow connection speeds, and failure to connect at all. Some problems can be fixed with initialization strings, commands that affect the way your modem communicates with other modems. Also, keep the software driver updated to ensure maximum compatibility and performance. Check with the manufacturer to see if they have issued an update.

There are two types of Winmodems: a controllerless modem with a DSP (digital signal

processor) and an HSP (host signal processor) modem. A DSP modem will possibly give you better performance of the two but does not perform as well as a hard modem. A hard modem typically costs about twice the price of a controllerless DSP modem and about four times the price of an HSP modem. Other than performance, the price difference between a hard and soft modem can indicate which type of modem you have. If the cost was less than \$50 for a 56Kbps modem, it's probably a soft modem.

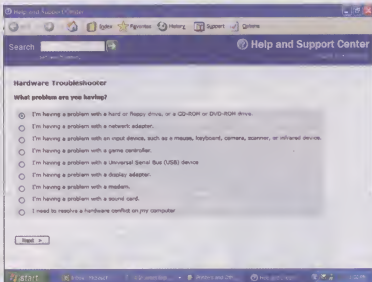
Another, but more difficult and time-consuming, way to discover what type of modem you have is to identify the chipset. Although

there are literally hundreds of modem brands, there are only a handful of chipsets. Unfortunately, the method for identifying the chipset is dependent on the manufacturer's instructions. Check the documentation that came with your modem or visit the manufacturer's Web site.

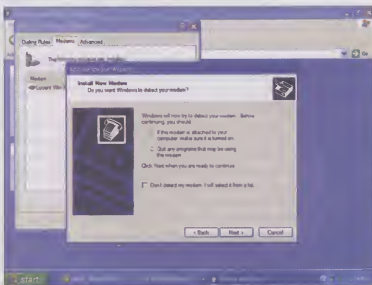
Walker says other easier-to-find clues to your modem type can be determined by considering whether you bought a brand-name computer. It's very likely to have a Winmodem because that modem is cheaper to install. Also, go to your Device Manager by right-clicking on the My Computer icon on the Desktop and selecting the Device Manager tab. If the listing for your modem has a three-letter extension, such as AMR, HSP, or something similar, your modem is probably a Winmodem.

■ **Help Is At Hand.** Next time your connection creaks, don't be defeated. Look into the troubleshooting tools Windows provides and check for conflicts in your system. Make sure everything is up to date and review your port speed and modem speed settings. You may fall in love with your 56Kbps modem all over again. **LE**

by Deborah Cooper



Microsoft's hardware troubleshooter program poses a series of questions to diagnose problems you are having with your system. Step-by-step instructions based on your answers help to resolve difficulties.



Windows 98/Me/XP all include the Internet Connection Wizard, which greatly simplifies the process of installing and connecting a modem.

No Connection

What To Do If Your Dial-Up Call Won't Go Through

If you are one of the millions of people who still use a dial-up modem to connect to the Internet, you have probably experienced periods of time when logons failed or were abnormally terminated. As with most computer glitches, connection problems seem to occur at the most inconvenient time, making them even more frustrating. At these times, it is important to take a logical, step-by-step approach to determine and resolve the problem.

■ Test Your Telephone Line.

Before you check anything else, verify that your telephone line is working. Phone line problems aren't as common as they were a few years ago. However, this is an easy thing to check, and it quickly eliminates some possibilities.

The best way to check your telephone line is to disconnect the wire from your modem, connect it to a working telephone, and dial your ISP (Internet service provider). If the call goes through and you hear the telltale sound of a modem at the other end, you have eliminated two components (the phone line and the connecting wire) from your list of possible suspects. The fact that the ISP's modem answered your manual call doesn't completely eliminate the ISP as a suspect, but it moves it way down on the list.

If there isn't any dial tone or the call won't complete, try changing the wire that connects the phone to the wall and redialing. If the call completes, you may have found your problem. Connect the new wire to your computer and try connecting to the ISP again. If you change the wire and still can't complete the call, try dialing another number. If this second number works, the problem may be with the ISP's telephone system or the telephone company's circuits to the ISP. If the second number doesn't work, the problem is probably with your phone line, and you should call your local telephone service provider.



■ **Is The Problem Really Yours?** A dial-up connection to the Internet requires two cooperating partners: you and your ISP. In fact, a failure to connect may not be your problem at all. Before you start tearing apart your equipment or reconfiguring your software, take time to make sure the problem is really yours and not the ISP's.

If you have a second computer available, try to establish a connection with it. If both computers fail to connect, the problem could be with the ISP. If you don't have a second computer available, try connecting to a different ISP. If your computer will connect to one provider and not the other, the problem may not be yours. At the very least, this test may eliminate your modem as a possible source of the problem.

If you suspect that the problem is with your ISP, get prepared before you call it. Make a list of the things you have checked, record any error messages exactly as they appear on your screen, and try not to call the

ISP on the same phone line to which your computer is connected. Use a second line or a cell phone, if available, so you can perform tests while the technician is on the line.

■ **Decide Where To Look First.** If the aforementioned tests indicate that the problem is with your computer, you must proceed with caution to avoid making things even worse than they already are. Diagnosing any computer problem requires some detective work, which, in turn, involves asking the right questions and examining the evidence. The first question you should ask yourself is whether the problem appears to be hardware or software related.

You have already eliminated the phone line and connecting wire, but other possible hardware problems can range from a faulty or intermittent modem to a malfunctioning serial port. If you have just installed a new modem, you may also be experiencing I/O (input/output) port or IRQ (interrupt request line) conflicts.

To verify that your computer and modem can communicate, open the Windows 9x/Me Control Panel (click Start, Settings, and Control Panel) and double-click the Modems icon. Click the Diagnostics tab, select the COM (Communications) port connected to your modem, and click the More Info button.

If your modem is functioning correctly, the Modems applet will display a window showing information about the COM port followed by a list of standard modem commands and the result returned by your modem for each command. If the applet displays an error message, your system has a hardware problem, which we will discuss shortly.

The Windows XP applet is slightly different, but the basic idea is the same. Click the Start button, click Control Panel, and select Printers And Other Hardware. Click the Phone And Modem Options link, click the Modems tab, select your modem, and click the Properties button. Select the Diagnostics tab and click the Query Modem button to begin the command test.

If you can connect to one ISP but not another, or if you can hear your modem dialing, the problem is probably not with your hardware and you should move on to the next section of this article.

■ **Resolve Hardware Issues.** If you aren't familiar with computer components or are uncomfortable taking the case off your computer, leave hardware issues to the experts. Most people who can overhaul a hot-rod engine have no business working on a computer, and vice versa.

Computer modems come in two basic forms: internal and external. Internal modems come in two types: those designed for the older ISA (Industry Standard Architecture) bus and the more modern PCI (Peripheral Component Interconnect) bus versions. ISA-compatible modems often require that you manually select the desired communications port and interrupt vector with jumpers or switches, and these selections must not duplicate those your computer is already using. PCI-compatible modems are automatically configured and easier to install and set up.

Most desktop computers are designed with two serial ports built into the motherboard. These ports are called COM1 and COM2, and they usually appear on the back of your computer as two 9-pin connectors. COM1 is normally assigned I/O address 03F8 and IRQ 4. COM2 is normally assigned I/O address 02F8 and IRQ 3.

The most common problem with a newly installed ISA modem is that the modem and one of the existing COM ports are configured to use the same I/O address or the same IRQ. This causes both physical devices to respond to the same set of commands. Because the built-in ports are integrated into the motherboard, they react faster and the modem appears to be dead because the serial port grabs the modem's commands and discards them. To correct this situation, you must disable the conflicting motherboard port or configure the modem to different I/O address and IRQ.

Win98SE/Me/XP include a handy utility for displaying system information, including IRQ information. To access this program, click the Start button and then click Run. Type `msinfo.exe` in the field and click OK. When the program window opens, click the plus sign (+) next to Hardware Resources and click IRQs to display a list of the currently used interrupt vectors and the devices using them.

If you are experiencing connection failures with an external modem, the problem could be with the serial port or the cable connecting it to the modem. Make sure the modem is turned on and the cable is connected securely at both ends. If the connectors on the back of your computer aren't marked COM1 and COM2, try connecting the cable to the other port.

■ **Resolve Software Issues.** A Win9x/Me/XP dial-up connection contains more than 50 individual settings. Your ISP should provide you with very specific instructions on how to set up a connection to work with its system. Although it is not necessary to understand every single setting and its effect on your connection, there are several that you should be aware of because they are common causes of connection failures.

When you double-click the icon for a specific dial-up connection, Windows displays the Connect To screen if the connection does not have a saved password or if the connection fails. This screen includes your username, your ISP's telephone number, and your current location. It also includes a field where you enter your password. Your ISP assigns the username and password, and they are almost always case sensitive.

The Phone Number field displays the telephone number your PC will dial to establish your connection. This number may be modified as a result of the value in the Dialing From field directly below it; it is important to have the correct location selected. To see what modifications are made to the phone number, click the Dial Properties button to the left of the location field to display the Dialing Properties screen.

If you frequently travel to the same remote locations, the Dialing Properties screen provides a convenient place to store all your location-specific rules, such as dialing 9 (or 8) for an outside line in a hotel. If you elect to save your password in the connection, you must set up Dialing Properties for each location you visit. When you travel, remember to use the Telephony applet in the Win9x/Me Control Panel or the Phone and Modem Options applet in the WinXP Control Panel to change your location before you use any dial-up connections. If you don't save your password, you can manually modify the telephone number before clicking the Connect button on the Connect To screen.

Adjust settings. Although incorrect passwords and bad telephone numbers account for most failed connections, a few other settings are worth mentioning. To

verify these settings, open the Control Panel and double-click on the Dial-Up Networking icon (or the Network Connections icon in WinXP). Right-click a dial-up connection icon and click Properties to open the connection's property sheet. Click the Networking tab and verify that Type Of Dial-Up Server is set to PPP (Point-to-Point Protocol). The other choices available from the drop-down list are only used when connecting to very specific, nonInternet services.

At the bottom portion of the same screen, verify that TCP/IP (Transmission Control Protocol/Internet Protocol) is the only protocol option selected. Internet connections use only TCP/IP and, depending on where you are calling from and the type of server to which you are connecting, IPX/SPX (Internet Package Exchange/sequenced package exchange) packets may arrive ahead of the TCP/IP packets and confuse the server at logon.

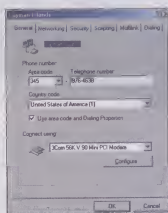
As long as you are looking at networking properties, click the TCP/IP Settings button to the right of the TCP/IP checkbox. Most ISPs instruct you to select Server Assigned IP Address and Server Assigned Name Server Addresses but there are exceptions. AT&T

Worldnet, for example, requires you to enter specific Primary DNS (Domain Name System) and Secondary DNS values. Check the settings on this screen against those provided by your ISP.

If you still experience connection problems or suspect that a dial-up connection's settings have been tampered with, the safest thing to do is to delete the connection and re-create it from scratch using the Make New Connection Wizard. There are just too many possibilities to check otherwise.

■ **Stick To Your Plan.** The key to successful troubleshooting is to stick to a plan and use a process of elimination. Check the obvious things first, and then move on to those items that are easy or quick to test. Replace hardware or reinstall software only as a last resort. **[L5]**

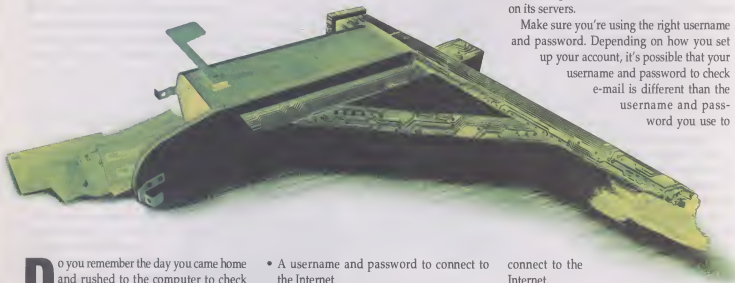
by Dick Archer



Dial-up Connection's main property screen has six tabs that contain more than 50 different settings.

One Day It Works, The Next It Doesn't

Resolve Problems Sending & Receiving E-mail



Do you remember the day you came home and rushed to the computer to check your e-mail *before* you checked your voice mail? If it hasn't already happened, it will.

As more and more of your friends and colleagues get e-mail addresses, you become more and more reliant on e-mail as a form of communication. People will opt to send you e-mail instead of a voice mail. Will their e-mail messages always get to you? Will you always be able to send e-mail?

Unfortunately, e-mail doesn't have the dependability of death and taxes. As with any post office, many things can stop the flow of mail, depending on how an address is written, whether the post office is slow, and whether your recipient is still at the intended address. How do you keep the mail moving through rain, sleet, and snow? Start by setting up your mailbox correctly.

■ Initial Setup Of Your E-mail Client.

Most users rely on a client-side e-mail application, such as Microsoft's Outlook and Outlook Express or Qualcomm's Eudora, to check e-mail. To configure one of these programs, you need to check with your ISP (Internet service provider), mail, or Web host to get the following setup information:

- E-mail address

- A username and password to connect to the Internet
- A username and password to check mail
- Incoming mail server (POP3)
- Outgoing mail server (SMTP)

The username and password you use to connect to the Internet and check mail can often be the same. POP3 (Post Office Protocol 3) is the protocol your incoming mail server probably uses. It lets your mail be stored on a server and forwarded to you when you request it. That's what happens when you check your mail. A different protocol, SMTP (Simple Mail Transfer Protocol), is used to send your mail.

Once your ISP activates your account and you have an e-mail address, you can open your client application and enter the above information under new account setup.

Problem: Nothing's working.

Solution: First, make sure you are connected to the Internet. Try loading a couple of pages in a Web browser window. If you are connected, it's possible that you have incorrectly entered the incoming or outgoing mail server. Go back to your account options or preferences and double-check that everything has been entered correctly. If you're not sure,

check the help section of your mail host or ISP's Web site for that information. If you can't find it there, pick up the phone and call.

Problem: I can't receive e-mail.

Solution: If your e-mail comes from any source other than your ISP, you need to use that source's incoming mail server (POP3). Although your ISP can connect you to the Internet, it has no ability to check mail if it's coming from a domain that's not hosted on its servers.

Make sure you're using the right username and password. Depending on how you set up your account, it's possible that your username and password to check e-mail is different than the username and password you use to

connect to the Internet.

Problem: I can receive e-mail, but I can't send.

Solution: This is a problem of authentication. When setting up a mail account that your ISP doesn't host, you need to still use your ISP's outgoing mail server. That's because the SMTP protocol will only send mail from a recognizable IP address. An IP address is the address that connects and identifies you on the Internet. Only the service that provides the connection, your ISP, can recognize that address.

For example, you'll run into the "I can't send mail" problem when you try to send a message from a personal account at work. You'll need to ask one of the tech people at the office for the name of the outgoing mail server. Once you know, make the appropriate change under account preferences.

Your IP address is not the only means of authentication. In some cases, you can use your username and password for incoming mail to validate outgoing mail. That means you need to download mail before you send mail. Check the advanced settings for the outgoing server. Under authentication make sure you're logging on to the incoming server

before sending mail. If you don't have a mail account (also known as a POP account) with the service you're using to send mail, the host of the SMTP server may have an option for you to create a dummy POP account on its incoming server. The purpose of the dummy POP account would not be to check mail but to authenticate you with a username and password before you send mail.

Validating outgoing e-mail is a preventative measure designed to thwart unauthorized, untraceable users from using send mail servers as a conduit for spam. What you can do all depends on what authentication schemes have been enabled on the servers. You need to check with your ISP and mail host to see what's possible.

Problem: My password isn't working.

Solution: Your password must be typed in exactly the same way every time. Passwords are case sensitive. For example, if your password is clownnose, and you type CLOWNNOSE or Clownnose, the password won't work. Sometimes a bad password results from the user accidentally hitting the CAPS LOCK key. Because passwords are usually hidden as you type them, you never realize you're typing CLOWNNOSE unless you looked at your CAPS LOCK light. If it's on, simply press CAPS LOCK again to turn it off.

The other problem could be that you're mixing up your passwords. The password for your mail account may not be the same as the password you use to connect to the Internet. This could be because of how the ISP configures your connection and mail, or it may be because you connect with one provider and check mail with a different one.

If you have completely forgotten your password, call your mail host or ISP and ask them how to best resolve this issue.

Problem: I tried to enter my password three times, and now I've been locked out of my account.

Solution: This is actually a preventative measure the mail server's administrator set up to deter crackers from making thousands of guesses at your password. If it happens to you, first look at the answers to the above problem to try to resolve your password issue. Then wait. Your account will unfreeze in a few minutes. There will be no notice. It can sometimes

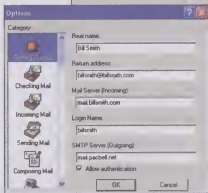
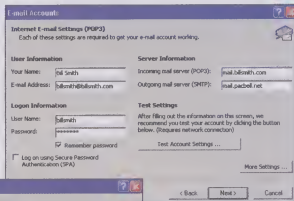
take as long as a half hour. At that point, if you figured out your password problem, access your account again.

Problem: Sometimes my e-mail application just hangs.

Solution: Client-side e-mail applications unfortunately have no way of alerting you to the arrival of a huge attachment.

The mail program only notifies you of the number of messages you're receiving, not the total byte size of your incoming mailbox. This becomes quite an issue for users connected to the Internet via a 56Kbps (kilobits per second) dial-up connection.

If you're not aware that someone is trying to send you a 3MB file, the download mail status indicator may appear unresponsive when it hits that large attachment. There may be a temptation on your part to click Cancel. Fight the temptation. If you see traffic coming through, as evidenced by the two monitors that sit in your Windows System Tray which represent your connection, be patient. The message is coming.



Eudora and Outlook have different-looking setup screens, but they both ask for the same information.

If you do not see any

traffic or you get an error message, it's possible that your e-mail did truly freeze. Mail failing midstream probably means a mail attachment exceeds the file size limitations as imposed by your mail host. When e-mail fails or freezes, or if you're just impatient and want to click Cancel, you can choose to check mail via Telnet or the Web.

Many mail hosts have an option to check mail via the Web. If yours doesn't, you can configure Hotmail (<http://www.hotmail.com>) to check your personal e-mail box. Whichever method you choose, you'll be able to see which e-mail has the large attachment and either delete it or download it.

Problem: I have been receiving mail all day. Now, however, my computer is asking for my password, and my password is not working.

Solution: If midway through downloading mail the process was canceled, crashed, or produced an error, it is possible that a pop lock occurred. Even though your client application fails, the mail server still thinks that you are downloading mail. Because only one login is possible at any given time, logging in again immediately will result in a failure to connect. Be patient in this situation. The server needs some time to reset. Wait about 15 minutes and try again. You may want to use Telnet or check Web mail to see if there's an attachment causing the problem.

Problem: Everything disappeared. Where's my incoming mail? Where's that cool navigation bar on the left-hand side? How do I get that preview of my e-mail messages to appear below?

Solution: All of your messages are still there; you just accidentally turned off some View setting preferences.

In Outlook and Outlook Express, look under the View menu. There you'll see options for changing your program's layout. In Eudora, the locations of the options are a tad scattered. Select Tools and then Mailboxes to bring up the left navigation window. To change any other viewable options, select Tools and then Options.

Problem: Messages that you send are getting bounced back.

Solution: This is a return to sender response that means that the network can't deliver the message with the given address. Double-check the address. Make sure there are no typos. Your client program will catch obvious typos, such as no at sign (@), before the message leaves your outbox. If you discover a typo, resend the message with the

correct address. Make sure you update your address book.

If the address has no typos, chances are your friend has changed his or her e-mail address. Contact that person by phone and find out what the new address is. The other possibility is that your friend's mailbox is full. If the address is correct and messages are still getting bounced, you'll need to forward the network responses to your mail host's administrator and see if he can isolate the problem.

Problem: It takes forever for my friends to get my e-mail.

Solution: E-mail is usually pretty quick, but sometimes a message can get stuck in a network queue and take hours or even days to arrive.

Instead of waiting, you have a few options. Send the message again and hope it takes an alternative route. You can also check with your mail host to see if there are any mail server problems. If so, you'll have to wait for the problem to be resolved. In such cases, you should have an alternative e-mail address as a backup. Set up a free e-mail account with a Web-based mail service, such as Hotmail or Yahoo! Mail.

Problem: I wrote this really long e-mail, and now I can't send it.

Solution: It's possible that during the time you were writing the e-mail, you lost your connection. It could have dropped for any number of reasons, or if you're using a dial-up modem it could have dropped because it had been told to disconnect if the computer is idle for more than 30 minutes. To change the wait to disconnect time or to turn it off, check the configuration settings for your modem connection.

Problem: I enter information into a mail form online, and I'm supposed to get a reply. However, I never get anything.

Solution: All mail from that Web site might be blocked by your mail host's spam filter. Call your administrator and ask if the mail server is blocking the domain in question.

Problem: I'm trying to send a message to my mailing list, and it chronically fails because an address that I know is valid keeps getting rejected.

Beth Hotmail and Yahoo! Mail provide an opportunity for you to set up your account to retrieve messages from other POP (Post Office Protocol) mail accounts.

Solution: In an effort to curb spam, your ISP has imposed a recipient limit for all sent mail. Some ISPs limit group posts to as few as 25 people. If you have a small group, just split the mailing list into multiple groups and send the same message to each group. If the number of groups gets out of hand, you'll have to use a service such as Yahoo! Groups (<http://groups.yahoo.com>) to create and manage your mailing list.

Many ISPs (Internet service providers) and Web hosting services have a network status page on their Web sites to let you know if there are any known problems currently being addressed.

Problem: I usually receive 20 messages a day, and now I'm getting a message that there's insufficient memory to accept the posted message.

Solution: You've probably filled up your disk space quota. If it's full, the mail server will stop storing mail.

In your mail program, there's an option to leave your mail on the server. By default, it's unchecked, meaning that once you download a message, it's erased from the server. If it is

checked, you may be unwittingly maxing your quota by storing months of old mail. If so, uncheck the box and log on to your mail server via Telnet or the Web and wipe out all the old mail.

Problem: I've checked everything, and my mail is still not working.

Solution: Sometimes it's not your fault. As you have probably realized, computers are not perfect. And the mail server that collects your mail is not perfect either. If it fails, you won't be able to check your e-mail. There's nothing you can do to fix the problem. It's an issue for your network administrator to solve.

This is an unanticipated network outage. There are also foreseen outages. Occasionally, your hosting company or ISP will have to shut down its servers to conduct maintenance. In an effort to be less intrusive, the outages will be scheduled on weekends or very late hours. Normally, such events will be announced by e-mail.

Quality ISPs and hosting services have a network status section on their Web site. If you suspect that there is something wrong, before you pick up the phone to ask, go to the Web site and see if there's a network status update. There may be detailed information letting you know when the situation will be back to normal. If it is down, wait, check the status when it's supposed to be over, and then try your mail again. If you're still having problems, then you can pick up the phone.

Network outages are completely out of your control. One way you can take charge is to pick an ISP and mail host that has lots of redundancy. Redundancy means that there are multiple servers doing the exactly same job. If one of them accidentally goes down, there's no interruption in service because the other servers pick up and continue the job.

■ Rain, Snow & Dogs. Even if you are trouble free in the e-mail department right now, you won't necessarily be that way in the future. Pat yourself on the back for reading this article. Knowing the possible problems today means you won't panic when your e-mail doesn't arrive tomorrow. **LE**

by David Spark



check is useless for things words can't describe.

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The Coolpix 5000

Out Of Site

Cookies Work As Your Name Tag On The Web

One of the timesaving conveniences of the Web is when a site knows you. Likewise, one of the time-consuming and frustrating experiences is when a site fails to remember you. What can cause a site to forget you, and what can you do about it? The most common source of this problem is related to cookies. Before you begin exploring cookie-related issues, you should understand the different types of cookies and how they work.

■ **Understand Types Of Cookies.** A cookie is a small amount of text placed on your computer when you visit a Web site. Used to record information about your visit to the site, cookies also identify you when you return. However, cookies don't run programs or infect your computer with a virus; only the Web site that created the cookie can read it.

Cookies enhance your Web-browsing experience, making many sites more convenient for you to use. For example, if you create a personalized page with stock quotes and local weather, a cookie helps recall your page when you return. Usernames and passwords can also be remembered with the help of cookies, but they are not normally stored in the cookie. Instead, the cookie contains a unique identification number. This identification number is linked to a database of information you have provided to the site, such as data you send in an online registration form.

Cookies that are permanently saved on your computer's hard drive are called **persistent cookies** and are retrieved when you return to a site. Other cookies are temporary, called **session cookies**. Commercial sites use session cookies to temporarily store your selections in an online shopping cart. After you close your browser, session cookies are removed.

Although cookies can enhance your Web browsing experience, they can also be used in ways you may not like. Internet-related advertising agencies use **third-party cookies** to track your online activity. Third-party cookies are not created by the site you are visiting. Instead, the cookie is created by an image or banner ad that is linked to an agency's site. Simply loading the

page automatically places the third-party cookie on your computer. By including these ads and images on the Web pages of multiple sites, the agency tracks activity across the Web. This tracking helps agencies develop customer profiles, which Web site owners use to develop marketing strategies.

By understanding how different types of cookies are used, you can make informed decisions when reviewing your browser's cookie settings. You can choose to block cookies entirely, but if you do, you won't enjoy the benefits of many cookie-enabled sites. What's more, some sites won't work at all. Ideally, you want to enable cookies on sites that you trust. Keep this ideal in mind as you check your browser's cookie settings.

■ **Check For Disabled Cookies.** To function properly, many Web sites require cookies. If a site is not recognizing you, cookies may be disabled in your browser's cookie settings. Both Microsoft Internet Explorer and Netscape Navigator provide options for blocking cookies.

To check your browser's cookie settings, follow the instructions below for the Web browser you use. Note that throughout this article, instructions apply to version 6 of both browsers. If you are using an earlier version, click your browser's Help menu and look for information about cookies in the Help contents.

Automatic cookie filtering in IE. To check your cookie settings in IE, click Internet Options from the Tools menu and then click the Privacy tab. If you see the word Custom, refer to the next section about advanced cookie filtering. If you see a slider bar, your browser is using the new automatic cookie filtering method discussed in this section.

IE's new cookie filter is based on a specification called **P3P** (Platform for Privacy Preferences). This W3C (World Wide Web Consortium)



specification attempts to standardize how Web sites describe their privacy practices (<http://www.w3.org/P3P>). The goal of the specification is to automate the process of comparing your preferences for use of your personal information with a Web site's privacy policy.

The basis of IE's new filter is a site's compact policy. A **compact policy** is a file that your browser looks at that describes how the site uses information it collects through cookies. IE also differentiates cookies based on whether they originate from the site itself (first-party cookies) or from a different site (third-party cookies). You define your privacy preferences by selecting a level on the slider. IE automatically compares your selection with the file that contains the Web site's compact policy to decide whether to accept or deny cookies.

If your slider is set to High or Block All Cookies, you may experience problems with sites remembering you. If you want to use a less restrictive preference, you can change your privacy setting to a lower level. The Medium High and Medium levels allow most first-party cookies and some third-party cookies. Alternatively, you can override the slider setting for a specific site or all sites. To override the setting for a specific site, click the Edit button on the Privacy tab. To override the setting for all sites, click the Advanced button.

Because IE lets you override your privacy settings on a site-by-site basis, you may experience problems if you have blocked cookies for a specific site. To check this, click the Edit button on the Privacy tab. Review the Managed

Settings list for sites set to Always Block. To enable cookies, change the setting to Always. Note that if your slider is set to Block All Cookies, you cannot override it with the Always Allow setting.

Advanced cookie filtering in IE. If you see the word Custom when you click the Privacy tab, click the Advanced button to view the Advanced Privacy Options. These settings are an alternative to using the slider. Here you can choose to Accept, Block, or Prompt for cookies from all first-party and third-party sites. You can also choose to always allow session cookies.

If first-party cookies are blocked, some sites may not remember you. You can change your selection to either Accept or Prompt. If you choose Prompt, IE warns you before it lets a site write a cookie to your computer and gives you the option to accept it or block it.

Cookie filtering in Netscape Navigator. To check your cookie settings in the Edit menu, select Preferences from the Edit menu. In the Category column, double-click Privacy & Security and then click Cookies. The Cookie Acceptance Policy screen displays with three options: Disable Cookies, Enable Cookies For The Originating Web Site Only, and Enable All Cookies.

If Disable Cookies is selected, some sites may not remember you. You can change the Enable Cookies settings. You can also check the Warn Me Before Storing Cookies box. When this option is selected, Netscape warns you before it lets a site write a cookie to your computer so that you can accept it or block it.

With the prompt to accept or block a cookie, you can disable cookies for a particular site. This could cause a site to no longer remember you. To check this, click the View Stored Cookies button on the Cookie Acceptance Policy screen. Next, click the Cookie Sites tab. Review the list for sites that cannot store cookies. If you want to accept cookies from a site that is listed, delete it from the list.

Check For Missing Cookies. Another reason that a site may not recognize you is that the cookie for that site is missing. An obvious cause is that you are using a different computer than when you last visited the site.

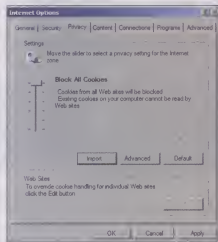
Cookies can also be deleted. Most browsers include options to delete all or specific cookies. To check whether a cookie is no longer present in IE, select Internet Options from the Tools menu. On the General tab, click the Settings button and then click the View Files

button. A list of all Temporary Internet files displays, which includes cookies. To locate cookie files, click the Internet Address heading. The addresses for cookie files start with Cookie:default@, followed by the Web site that set the cookie.

To check whether a cookie is no longer present in Netscape, select Preferences from the Edit menu. Double-click Privacy & Security in the Categories column and then click Cookies. Next, click the View Stored Cookies tab. Cookies are in alphabetical order by site.

■ Troubleshoot Automatic Completion.

In addition to using cookies to remember you, most Web browsers include a feature that automatically completes usernames and passwords. When the feature is enabled (which is not a cookie), the browser displays a prompt asking whether you want the browser to remember login information. If you answer Yes, the browser will recall the information the next time you return to that login page.



To view the cookie settings in Internet Explorer, select Internet Options from the Tools menu and click the Privacy tab. If the setting is Block All Cookies or High, sites may not be able to store cookies and remember you when you return.

If this feature is not working, follow the troubleshooting instructions below based on your Web browser.

Check AutoComplete in IE. To store and recall information you enter on Web pages, IE uses its AutoComplete feature. To verify that AutoComplete is enabled for usernames and passwords, select Internet Options from the Tools menu. Click the Content tab and then click the AutoComplete button. Make sure that both User Names And

Passwords On Forms and Prompt Me To Save Passwords are selected.

If you answer Yes to the prompt to save username and password information, the AutoComplete feature will suggest possible matches the next time you visit that login page. To display the possible matches, you must correctly type the first character of the username you established. If a list of suggestions does not display, you may be typing the incorrect character.

Check Password Manager in Navigator. Navigator includes a Password Manager feature that stores and automatically completes usernames and passwords. To check your Password Manager settings, select Preferences from the Edit menu. In the Category column, double-click Privacy & Security and then click Web Passwords. Make sure that Remember Passwords For Sites That Require Me To Log In is checked.

If you tell Navigator to remember login information, it automatically fills in the username and password the next time you visit that login page. If Navigator fails to do this, click the View Stored Passwords button on the Password Manager screen. A list of Web sites and associated usernames displays. If the site is not listed, the login information for that site has not been saved to the Password Manager.

Remember Me. If you discover that a browser setting is the root of your problem and you adjust the setting, the site may not remember you right away. In this case, follow the site owner's instructions for obtaining your login information. When you know your login information, you can re-establish your identity with the site.

In addition, a site may forget you for other reasons. For example, a Web site may implement new methods for keeping track of visitors, causing your information to become obsolete. If you are having problems with a particular site, contact the site owner for assistance.

Our troubleshooting information should help you benefit from the timesaving convenience of Web sites that know you. By accepting cookies from sites that you trust and enabling automatic completion of usernames and passwords, you will enhance your Web-browsing experience. **15**

by Carmen Carmack

Help Getting In

What To Do When You Can't Log On To The Network



The ability to access other computers, printers, and files provides a remarkable resource for both office and home computing. Networking makes it easy to access information and share resources among a group and makes working from home much easier by letting you tap into your office network.

Networking has become such a vital component of computing that its glitches can cause extreme frustration. Few things can have a user reaching for a bottle of aspirin faster than a rejected username and password. This article explores the basics of networking, issues that may crop up that prohibit you from logging on to the network, and steps to resolve the problems.

■ **Where To Start.** When troubleshooting network issues, start off with the basics. Double-check the hardware; ensure that everything is turned on and receiving enough power.

All the connections. Make sure your system is equipped with a NIC (network interface card) or network adapter that is compatible with your network setup. If you are connecting two or more computers to an Ethernet network, you will need a hub, CAT5 cabling, and RJ45 connectors. A hub provides a common connection point for a computer and other devices on the network.

Alternately, you may also use 10Base-2 coaxial cable, which does not require a hub. If you are using a router to connect to the Internet, make sure that the router is functioning correctly. A router receives packets of data within the network and forwards them toward their correct destination.

Also, make sure the cables are connected securely into the right port on the computer (refer to manufacturer's documentation if you're not sure which port is the right one).

Your type. Passwords are case sensitive, so make sure that the CAPS LOCK key is turned off. This means that even if you are entering the correct information but happen to be using uppercase letters (when the password should be in lowercase), you will not be able to log on.

DUN with LAN. You may also have trouble logging on to your network if you switch from being connected to your LAN (local-area network) to DUN (dial-up networking) or vice versa. This happens because of a change in the TCP/IP (Transmission Control Protocol/Internet Protocol) address, an address that lets the network find your PC. Some networks have address ranges for DUN or LANs. Sometimes your computer will not release the TCP/IP address used for DUN when you switch to the LAN and will not have a valid address to get on the network.

For Windows 9x and Me, click Cancel on the logon dialog box at startup and go to Start, Run, and type `winipcfg`. This takes you to the IP Configuration screen. Select Release All; the number for your IP address will reset to all zeros. Then click Renew All. You will need to reboot your computer to log on properly.

If you are connected to a Win98-based computer using DUN and you have only the Novell IPX/SPX-compatible network protocol installed, you will receive no notification when the connection is dropped. It's likely you will not recognize the connection is broken until you try to access a shared resource. When this happens, you will need to reconnect. The easiest way to reconnect is to shut down and restart the computer.

Bang on the door. Be sure that the system has not locked you out. Systems can be configured so that a user may attempt to enter a username and password only a predetermined number of times in a defined time period before the system will deny you access the network. Effectively, the system will lock you out even if you enter the correct information. This is a security measure to prevent people from randomly guessing usernames and passwords until they get lucky and get in.

If you are locked out, you will need to contact a system administrator, who will unlock your account from the server side.

■ **The Message Matters.** If you have completed all the basic checks and are experiencing a specific problem, here's how Microsoft recommends dealing with specific

error messages, along with an overview of what causes them.

Error Message: "Error 691: The computer you are dialing in to cannot establish a Dial-Up Networking connection. Check your password, and then try again." This error occurs in Win98/98SE and WinMe.

Cause: This may happen if the Setupx.dll file is missing or damaged. The Setupx.dll file aids in setting up software and hardware for your PC.

Resolution: Load a new version of the Setupx.dll file. For Win98 users, this file is on the Win98 CD-ROM and must be extracted because it's compressed and stored in a cabinet (CAB) file. It may be helpful to use the Ext.exe tool, which builds a command line for the Extract.exe tool. The latter tool is located on the Win98 or Me Startup disk. To extract a file from a CAB file, open the Ext.exe program from the Win98 Startup disk and follow the instructions to extract the Setupx.dll file.

Error Message: "Access Denied." This error message applies to Win98/98SE/Me.

Cause: This may occur when you log on to a network, such as your office network, and then establish a VPN (virtual private network) connection that also requires you to log on to a domain. The VPN will not let you log on and may give the Access Denied error. You may also get an error message saying that you have not been validated by the domain server. This happens because the VPN connection cannot log on to a second domain.

Resolution: The easiest resolution for this is to simply not log on to your domain when you start Windows. Instead, start your VPN connection, which prompts you to log on to your Windows NT network, which controls the domain server, and then log in. To log on to another domain, simply restart your computer.

Error Message: "Windows cannot locate your roaming profile and is attempting to log you on with your local profile. Changes to the profile will not be propagated to the server."

Detail: Network path was not found."

Cause: This message may occur if the server that contains the user's roaming profile cannot be reached by the workstation and the person has not logged on to that computer previously. A roaming profile contains user-specific information, such as which printer to use, e-mail settings, wallpaper, and screen saver.

Resolution: In this situation, the user will be able to successfully log on to the network, but his system will not be configured as he normally would see it because the roaming profile is not available. Contact your system administrator, who will need to resolve the issue with the server.

PTTP (Point-to-Point Tunneling Protocol) server over a RAS (remote access service) connection. PPTP is an encapsulation and transmission protocol that lets remote users gain access to private networks. It can also be used to create VPNs, which are secure networks that extend to nodes through the public Internet.

However, this message does not appear when the user connects with a DUN connection. The domain login may appear prior to the tunneling login prompt. This causes a problem because the tunneling must first recognize the user before creating authentication on the domain. This can also happen if the computer is simply not physically connected to the network when it's booted up.

Resolution: To correct the situation, users need to cancel the request for Windows domain login by clicking Cancel on the logon dialog box. Then when the PPTP connection occurs, the user should enter his network password to log on to the network.

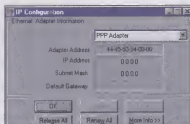
Error Message: "No Logon Servers Available." This message may appear on Win95/98.

Cause: This error may occur when a user is configured to log on only to certain computers in a domain and attempts to connect to a computer that is not set up for him to have access to. This error does not appear when the user attempts to connect to a computer that is set up for share-level of security. Share-level security lets all other users access a resource once they enter in the correct password for that resource. The password is set up by the owner of that resource.

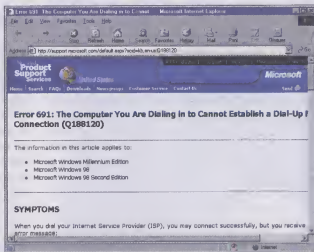
Resolution: The computer the user is attempting to access must be configured for share-level security. To set this up, select Start, Settings, Control Panel, and Network. Select the Access Control tab, click Share-Level Access Control, and then OK.

Find More Information. Many users have a common initial response to a problem: Holler at the computer. From there, the troubleshooting methods vary. Microsoft provides a robust online resource with its Knowledge Base, available at <http://support.microsoft.com>. [E]

by Rebecca Rotwing



If you are having trouble logging on to your network when you switch between a LAN (local-area network) and DUN (dial-up networking), go to the IP Configuration dialog box. Here you can release your previous TCP/IP (Transmission Control Protocol/Internet Protocol) address and start anew after restart.



If your problems logging on to your network are not covered in this article, one additional resource to look into is Microsoft's Product Support Services Web site (<http://support.microsoft.com>).

Error Message: "No domain controller was available to validate your password. You may not be able to gain access to some network resources." This error may happen in Win95/98.

Cause: A user may get this message when using Connection Manager to connect to a

Alone In The Group

Find Other Machines On Your Network

Home and office networks are usually very reliable. However, this doesn't mean they are completely immune to problems. A common issue is the sudden disappearance of network resources from your Desktop.

A network resource can be a shared folder on a PC connected to the network, another computer, a printer, or a hard drive that is part of the network and is accessible to other network users. We will explain what can cause available network resources to suddenly become unavailable and give you some tips and techniques to help you troubleshoot and resolve these situations.

■ **Network Adapter Woes.** When you discover that a network resource, such as a shared folder or file server, is suddenly unavailable, take a look at your network adapter first. Your network adapter is the hardware device, typically a card on one of your computer's PCI (Peripheral Component Interconnect) slots, that lets you connect to the network. The connectors at both ends of your network cable, called RJ-45 connectors, plug into the back of your network adapter. Locate your network adapter in the Device Manager and make sure the device's name is not marked by an exclamation point (!) inside a yellow circle. This indicates a problem with the device driver.

To do this in Windows 98 and Windows Me, click Start, Settings, and Control Panel. In Control Panel, double-click the System icon and click the Device Manager tab in the resulting window. Click the plus sign (+) next to Network Adapters in the hierarchical tree view in Device Manager; your network adapter should be listed there.

In Windows XP, click Start, Control Panel, and Performance And Maintenance. Double-click the System icon to launch the System Properties window. Click the Hardware tab and click the Device Manager button to launch the Device Manager window. Click the plus sign next to Network Adapters to find yours. Verify that the listing for your adapter does not feature the aforementioned yellow mark.

If a device driver is the problem, remove your network adapter from the Device Manager



and reboot the computer. To do this in Win98/Me, highlight the marked device's name and click the Remove button. In WinXP, right-click the device's name and click Uninstall to remove it. When you reboot, Windows rediscovers the device and reinstalls it. Make sure you have your network adapter's original drivers before you begin this process.

■ **Share The Pain.** If a shared network resource disappears, a quick troubleshooting technique is to locate the device and verify its sharing status. A shared folder or network resources features an icon of a hand cradling the folder, drive, or computer icon. If this icon is not present, the folder is no longer shared.

To enable sharing in WinXP, right-click the folder or shared drive, click Properties, and click the Sharing tab. Enable Network Sharing to make sure the folder or drive is shared across your network. You can also tell WinXP whether to let others modify the files within the folder or drive.

In WinMe, right-click the folder or shared drive, click Properties, and check the Shared As checkbox. You can also set up the resource's share name and one of three access types: Read-Only, Full, or Depends On Password.

If you right-click a resource on another PC and you don't see a menu option for Sharing, then you must install the File and Printer Sharing for Microsoft Networks service. The

File and Printer Sharing service lets you enable network sharing in a computer; if the service is not installed, you cannot share any of the computer's folders, drives, or printers. In Win98/Me, double-click the Network icon in the Control Panel, click the Configuration tab, and click the Add button to install the service.

In WinXP, click Start, Control Panel, and Network And Internet Connections. Double-click the Network Connections icon to launch the Network Connections window. The Network Connections window shows a list of icons representing the various connections in your system. Your network connection icon is typically called Local Area Connection; right-click this icon and click Properties.

The Local Area Connection Properties window shows your network adapter's name under the Connect Using option group and shows you a list of services that use this adapter (in networking parlance, the services are "bound" to the adapter) under the This Connection Uses The Following Items heading. If File and Printer Sharing for Microsoft Networks is not on the list of items, click the Install button to install the service. In the Select Network Component Type window, highlight Service and click the Add button. Highlight File And Printer Sharing For Microsoft Networks and click OK. Click the Install button to install File and Printer Sharing for Microsoft Networks.

■ **What's In A Name?** Verify that all computers in your network are part of the same workgroup and that all computers have a unique name. In Win98/WinMe, double-click the Network icon in Control Panel and click the Identification tab. The computer's name and the Workgroup name are displayed here. Each computer in your network should have a unique name and a common workgroup, so make any needed changes to make sure this is the case.

In WinXP, click Performance And Maintenance in Control Panel and click System. Click the Computer Name tab; the full computer name and Workgroup are displayed. Click the Change button to make any changes.

■ **Connect With It.** Networking adds a whole new level of complexity to our everyday computing experience. Thankfully, Microsoft continues to improve Windows' networking savvy and to add features that make troubleshooting networking issues easier. [E]

by Sixto Ortiz Jr.

Out Of Date

What To Do If Windows Update Fails

Starting with Windows 98, Microsoft began to enhance the update process for its flagship OS (operating system). This evolution has progressed to the point that Windows is now able to automatically check for new updates without any action required on your part. This full automation works so well you never notice it doing anything until Windows advises you that new updates are ready to be installed. Windows Update first became fully automated in Windows Me and 2000 and is available in both the Home and Professional versions of Windows XP.

As with most software, however, Windows Update occasionally fails to perform. Crackers are very good at exploiting weaknesses in Windows and in other Microsoft programs that access the Internet so keeping Windows current is essential. We'll take a look at the different scenarios under which Windows Update can fail and show you what steps to take to restore this important function.

■ Automate The Update. Win98 was the first of the Windows lineage to automate the OS update process. To enable this automation, Microsoft created Windows Update (<http://www.windowsupdate.com>), a Web site featuring a Product Updates catalog of critical and noncritical Windows components to enhance and update your system. Windows Update became a central Windows feature.

The Windows Update Web site works by scanning your Windows system components. Based on the results of this evaluation, Windows Update then presents you with a menu of component choices to download and install to your computer. All you need to do is select the updates you wish to install and click a button. The components are then downloaded and installed on your system.

How it works. The Web site uses an ActiveX control named Wuv3is.dll to perform these activities. When you access the Windows Update Web site for the very first time and you click the Product Updates link, a Security Warning dialog box is launched, prompting you to install and run the Windows Update Control Package ActiveX control. The dialog box contains a digital signature that certifies Microsoft

as the manufacturer of the ActiveX control. Click Yes to install the control. If you want more information before proceeding, click More Info; this launches a Help window that explains the purpose of digital certificates and signatures.

Another critical component is Wupdmgr.exe, the Windows Update Manager. In Win98/Me, this component is known as the Windows 98 Windows Update Manager, and in WinXP and Win2000, it is known as the Windows Update Manager for NT. This is the component that points your browser to the Windows Update Web site whenever you click the Windows Update shortcut found in the Start menu.

With WinMe, Microsoft enhanced the update process even more by introducing the Automatic Update feature. When fully automated, Automatic Update uses a file called Wuauc1.exe (Windows Update Autoupdate Client) that works in the background and queries the Windows Update Web site for new updates to your Windows installation during periods of little or no Internet activity.

When an update is located, Automatic Update informs you it's ready to download

and install the necessary files. You can click the Install button to begin the installation immediately, or you can postpone the installation by clicking Remind Me Later. If you want to learn more details about the downloaded patch, click the Details button, which launches a window containing information about the updates you are about to install.

■ Out Of Date. The Windows Update process, whether you manually browse to the Windows Update Web site or automatically connect from your PC, is very much tied to your Internet connection settings. Many of the problems that cause update installation failures via the Windows Update Web site or the Autoupdate Client are directly related to Internet connection problems or to incompatible security settings. Also, the absence or the corruption of certain system files is a frequent cause of problems with delivery and installation of Windows updates.

Stopped by the admin. If you attempt to connect to the Windows Update Web site and your browser displays a page stating that your organization would rather distribute updates internally or that your System Administrator disabled Windows Update, the first step is to check with your system administrator to review your organization's policies. If you find this page when you type the Windows Update Web site URL (uniform resource locator), it means your network administrator disabled



the Windows Update feature in your organization's Windows configuration.

Network and system administrators maintain control over their installed user base by preventing users from updating Windows. By deploying updates themselves, your IT department personnel have time to test updates within your organization's computing environment before releasing them.

Burned by the firewall. These days, a good firewall is a necessity, especially if you are using a broadband connection to access the Internet. If your firewall is doing the job it is designed to do, suspicious incoming traffic is kept out of your PC by making your data ports invisible to crackers. However, your firewall can also prevent your browser from reading the Windows Update Web site. For example, if you are unable to access the Product Updates pages or to download or install a needed file, your firewall settings are a possible cause of the problem.

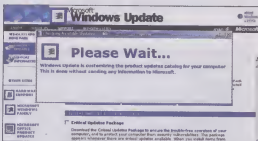
First, verify that your firewall is not closing Port 80. Port 80 is used by your PC to accept incoming and outgoing HTTP (Hypertext Transfer Protocol) traffic. If Port 80 is disabled, you are unable to access any Web site, not just Windows Update. Check with your firewall manufacturer's documentation to see how to prevent your firewall from closing Port 80.

Some firewalls, such as ZoneAlarm (<http://www.zonelabs.com>), not only stop suspicious incoming traffic, but also stop suspicious outgoing traffic. This functionality prevents malicious code, such as a Trojan horse, from sending information to another PC somewhere on the Internet. If the Autoupdate client is not working properly, make sure your firewall settings are not preventing Wuauclt.exe from communicating with the Windows Update Web site. Consult your firewall's documentation for the steps you must take to allow an application to communicate with a remote server.

Lost with Explorer. Internet Explorer uses the concept of security zones to let you control multiple Internet security settings that control scripting, ActiveX controls, Java, and other Internet technologies that can be manipulated to do damage. If you are having trouble accessing the Windows Update Web site or automatically downloading updates, check your IE security settings.

If IE is not set to run ActiveX controls, the Windows Update Web site or the Autoupdate Client will not work properly because both the site and the Client use an ActiveX control to determine the updates your system requires. IE

features four Web content zones: Internet, Local Intranet, Trusted Sites, and Restricted Sites. If IE's Internet Zone security settings are set to High, IE does not let you download any kind of



When you click the Product Updates link at the Windows Update Web site, the Windows Update ActiveX control checks your system's installed files against the product updates catalog to determine which updates you need.

ActiveX control. On the other hand, setting the Internet Zone settings to Medium lets you download signed ActiveX controls. A signed ActiveX control contains a digital signature certifying the control's authenticity.

To check these settings in IE, click the Tools menu, select Internet Options, and click the Security tab. Highlight the Internet Zone by clicking it, and click the Custom Level button. If Medium is chosen in the Reset To drop-down list at the bottom of the Security Settings dialog box then no further action is required. If High is chosen in the Reset To drop-down list, then change the setting by choosing Medium.

Although most signed ActiveX controls come from reputable sources, keep in mind that anyone can obtain a digital signature and use it to sign a malicious ActiveX control. Always review a control's digital certificate carefully. If you don't recognize the name of the company or entity signing the control, you are better off not installing it.

Critical files. The update process requires a few files in order to work properly. For example, if you click the Windows Update shortcut on the Start menu and nothing happens, the Wupdmgr.exe file is missing or damaged. If the Wuauclt.exe file is missing or damaged, Autoupdate in WinMe/XP will not work.

To restore the functionality provided by these files, you must restore the files from your Windows installation CD. The files are stored within CAB (cabinet, the compression format Microsoft uses to store installation files) files in your installation CD and must be extracted. Keep in mind that a missing Wupdmgr.exe file merely eliminates the one-click access to the Windows Update Web site. If you point your

browser to <http://www.windowsupdate.com>, the site functions as usual.

If you experience problems using the Windows Update Web site, a file called Vbscript.dll may be corrupted or missing. For example, if you receive a scripting error while downloading an update, restore a new copy of the file from your installation CD.

In Win98, use the System File Checker tool to restore the file from your installation CD. Click Start, Programs, and System Tools. Click System Information and, in the Tools menu, click System File Checker. To extract the specific file, click Extract One File From Installation Disk and type the name of the file you are looking to extract. In WinMe, you must use the Extract File button in the System Configuration Utility dialog box to restore the file. To get there, click Start, Programs, Accessories, System Tools, and System Information. In the System Information dialog box, click Tools and System Configuration Utility. Click the Extract File button; in the resulting window, you can type the name of the file you need, or you can browse to the file name if you are trying to replace the copy of the file on your system with a fresh copy from the CD. Click Start to begin the process (have your Windows installation CD in the drive, of course).

Finally, in WinXP, click Start and Run. Type msconfig at the command line to launch the System Configuration Utility. At this window, click the Expand File button to launch the Expand One File From Installation Source window. Specify the file to restore in the File To Restore text box by typing the name or clicking the Browse File button. In the Restore From field, type the drive name where the Windows installation files are located or click the Browse From button to search.

■ Latest & Greatest. The ability to automate the Windows update process is one of the most important Windows features, and one of the most reliable. As we've seen, there's a lot going on behind the scenes to help you keep your Windows installation up to date. Apply the tips and techniques we've discussed to fix your updating capabilities during the rare occasions when problems occur. In this networked age where hackers continuously devise new ways to exploit weaknesses in Windows and other Microsoft software, it is imperative to keep your system current. **[E]**

by Sixto Ortiz Jr.

Networking In XP

Keep Conflicts At A Minimum



Many homes and small offices have multiple computers, printers, scanners, and various other peripherals. A network lets users link these computers and devices together so that users can perform functions such as exchanging documents and sharing a common printer. In a LAN (local-area network), the computers are in a central area, usually the same building, while the computers in a WAN (wide-area network) are far apart and typically connected over phone lines.

In an effort to improve the user and administrator's experience with networking PCs, Microsoft has added a networking wizard to Windows XP. This wizard walks you through the steps needed to create a network. The networking experts at Brian Vincent Associates in Phoenix explains that users must fulfill many system and hardware

requirements and steps to successfully create a home or small office network.

If users don't correctly complete any of these requirements or steps, the network may not work properly or recognize a certain computer, printer, or other device. If you experience a problem with your network or adding a new account to the network, you will want to double-check that you took each of the steps and accommodated for the system requirements.

■ System Requirements. Your home or small-office network will need several hardware components in order for the network to work successfully. For starters, you will need two or more computers that are equipped with a NIC (network interface card). A NIC is the physical device that connects the computer to the network. You will also

need cables to connect each one of the devices to the network.

If you are connecting two or more computers to an Ethernet network, you will need a hub, which is a common connection point for computers on a network.

If there is a problem with any of these items, you may experience a problem across the entire network. Double-check all physical connections, making sure that each computer is plugged in and receiving power, cables are securely connected, and all equipment is designed to work with WinXP.

■ Network Setup Wizard. The Network Setup Wizard walks you through the steps required to set up a network by asking you to select from options and answer yes-or-no questions. Occasionally, the wizard will make recommendations about your system to help you through the process.

To access the wizard, go to Start, All Programs, Accessories, Communications, and Network Setup Wizard. The wizard will prompt you to input information about the network. The wizard will set up Internet Connection Sharing, which lets multiple computers get online with a single account. If your network involves two or more LANs, the wizard will create a bridge that permits a shared Internet connection.

The process. To start, the wizard asks you to determine how the computer you are adding to the network will access the Internet. You will need to choose one of the following options. You base your choice on your setup: This computer connects directly to the Internet. The other computers on my network connect to the Internet through this computer; This computer connects to the Internet through another computer on my network or through a residential gateway; You may also choose "Other" if neither option fits your network setup.

If you indicate the computer will connect directly to the Internet and other computers will use it to get online, the wizard will list your options for connecting to the Internet and make a recommendation. For example, if you have a cable modem and a 56Kbps (kilobits per second) modem, the wizard may recommend the cable modem. Accept the recommendation or make your own selection.

Next, enter a computer description and a computer name unique to the network. The description appears in My Network Places or Network Neighborhood on other networked

computers. This name will be how the network identifies a specific computer.

From there, enter a workgroup name. The workgroup name must be the same on all of the networked computers. If the workgroup name is different on any computer, that computer will not be part of the network. The wizard then shows you all the settings you selected.

If you make an error, you may edit the workgroup name later. To do so, right-click My Computer and select Properties. This brings up the System Properties window. Select the Computer Name tab and click the Change button. Enter in the new computer name and restart the computer for the change to take effect. Once the wizard configures your computer's network settings, it will ask you if you want to create a Network Setup Disk or CD. This disk or CD will let you install the networking software on the other computers in your network that are not running WinXP.

■ After The Wizard. Once you successfully run the wizard on all computers, your network should be functioning correctly. However, if this is not the case or any of the computers on the network are not being recognized, and you are certain that you entered all information correctly, here are some troubleshooting steps.

Hardware conflicts. If your network is not identifying a computer on the network, check with the Device Manager to determine if there's a hardware conflict. To do this, go to Start, click Control Panel, click Performance And Maintenance, and click System. In the Systems Properties dialog box, click the Hardware tab and click Device Manager.

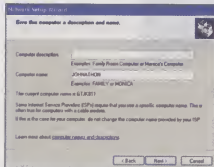
From there, double-click Network Adapters to see the list of installed adapters. If you see a yellow exclamation point (!) next to any adapter, you have a hardware conflict. To fix the problem, right-click the adapter with the problem and select Properties. Click Troubleshoot. The Hardware Troubleshooter will ask you a series of questions to help you determine what the actual problem is. These questions include such topics



Because there are several different techniques you can use to connect your network to the Internet, the Network Setup Wizard needs to know how you want to connect to the Internet.

as incompatible hardware and driver issues. The troubleshooter will then offer several solutions, but the program will automatically fix your problem.

Device not listed. If your device is not listed in the Device Manager, the computer does not recognize it. If you have a CD or diskette the manufacturer of the device provided, use it to install the new driver. If not, use Windows' Add Hardware Wizard.



As you set up the network, the Network Setup Wizard will ask you to enter a description and a name for the computer so that it's unique to the network. This name will be how the network identifies the PC.

To access the wizard, go to Start, Control Panel, and Printers And Other Hardware. Under the See Also box on the left, click Add Hardware to bring up the wizard. The system will search your computer for hardware and ask you if you have installed the hardware. If the hardware has already been installed, the system will list all the hardware it can find.

Select the correct hardware from the list. Otherwise, go to the bottom of the list and click Add New Hardware Device, then click Next. The wizard will ask you to insert the diskette or CD. If you do not have a diskette or CD, contact the device manufacturer.

PING. If you have a computer that is not being recognized, determine if the computer is actually linked to the network. You can check connectivity with PING (Packet Internet Groper), which sends a message to the specified address

(in this case the computer name) and waits for a reply. If you "ping" a computer and get a prompt response, the computer is active on the network. If not, you know that the computer in question is not properly connected and you can concentrate your troubleshooting efforts here.

To ping a computer, use a computer the network recognizes, click Start, click Run, type cmd in the field, and click OK. Type ping and the name of the computer in question and click OK. If everything is performing correctly, you will see several prompt replies from the other computer.

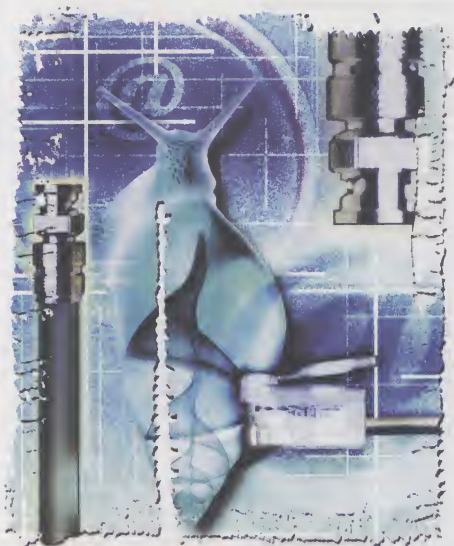
■ When All Else Fails. If you have run the networking wizard on each computer but not all computers on the network are communicating correctly, you may want to turn to the Home And Small Office Networking Troubleshooter in WinXP's Help And Support Center. To find it, click Start and Help And Support. Under Pick A Help Topic, click Networking And The Web. Then, under Networking Or Web Problems. Finally, select Home And Small Office Networking Troubleshooter.

Additionally, Microsoft provides its Knowledge Base online at <http://support.microsoft.com> where you can enter in specific topics and search for more information. This may provide an alternative resource for additional information. [E]

by Rebecca Rutwidge

Bandwidth Bromides

How Can You Speed Up Your Broadband Connection?



things you can do to pinpoint the problems or at least minimize the chance that they will crop up in the future.

■ **Keep It Simple.** The first steps you should take when a broadband connection acts up or goes dead are all very simple. After all, odds are very good that the problem lies outside your home or office and, in most cases, is probably an issue on your ISP's end of the line that the ISP is (one hopes) working feverishly to correct.

In fact, the first thing you should do, if you have any connectivity to the Internet at all, is visit the ISP's Web page and check to see if there are any notices or alerts concerning network outages in your area. Typically, this information will be posted in an easy-to-spot area of the Web site, such as the customer service or account management pages.

If an outage or other performance issue is posted on the Web site, there is very little that you can do except wait patiently for service to be restored. However, you may wish to take note of the date and time that your service first failed and then record the date and time when it is restored because you may be entitled to a service credit for the downtime.

Clearly this is only an option if you can actually connect to the Web, but you can usually still get network status information over the phone if you call the ISP's customer service number. If you have to, navigate through any recorded menus until you reach a live human being and then ask that person if there are any known service problems in your area.

If there aren't any recorded service issues, you may have other problems, but as long as you have a professional customer service representative on the line, you may wish to ask for advice on how to get your connection up and running again. This is, after all, his job.

■ **Think Locally.** If your ISP does not report any known service interruptions in your area and the customer service personnel can't help you, you still have quite a few options for troubleshooting the line from your end. The first thing you should do to see if the problem is indeed on your end is to reboot your computer to see if that fixes the situation. It is absolutely amazing how often a simple reboot will correct the bulk of errors the average user encounters.

If a reboot does not fix the problem and you have an external cable modem or DSL router, unplug the device, plug it back in, and then reboot your computer while the modem

Broadband Internet connections over DSL (Digital Subscriber Line) and cable lines offer myriad advantages over standard dial-up accounts. After all, they are considerably faster than a modem connection, always active, and, in most cases, cost little more than the combined expense of an unlimited dial-up account and a dedicated modem line.

These connections can also be perplexing, however, as they can leave you high and dry

in the event of a service outage or some sort of flaw or glitch in the network configuration on your computer.

We will discuss ways to test and troubleshoot a problematic broadband connection. In many cases, the problem with a failed DSL or cable connection lies outside your home, either somewhere along the Internet between you and your ISP (Internet service provider) or with the ISP itself. Still, there are a few

or router powers back on and resynchronizes with the network. If the modem or router has a reset button, you can try that first, but if nothing changes go ahead and try an old-fashioned unplugging.

Of course, you should also check to make sure that your network cable is plugged into your computer and to the wall jack, router, or cable modem.



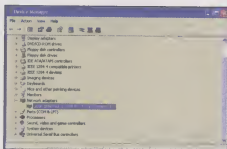
Before panicking over a troublesome broadband connection, go to the Web site of your ISP (Internet service provider) to see if it is aware of any service problems on its end.

■ In The NIC Of Time? Both DSL and cable connections require your computer to have an Ethernet NIC (network interface card) installed. The better NICs feature little, green LEDs (light-emitting diodes) to indicate power, while some also offer an LED that blinks to show activity over the line. If your NIC has these LEDs, you should check to see that they are operational. If they are not, you may very well have a dead NIC, which would of course also kill your broadband connection entirely.

If your NIC is lit up nicely and blinking merrily away but your connection is still not working, try looking for updates to your NIC's driver online. In the event of broadband failure, you might want to keep a dial-up line as a backup. That way, you can access the Internet to retrieve information to help you right the ship.

First stop for Windows users is the Windows Update site maintained by Microsoft. Go here by launching Internet Explorer, click the Tools menu, and select Windows Update. Follow the Web site's prompts to scan for updates to the OS (operating system). When the scan is complete, look for any entries under the Driver Updates heading and make sure you download and install any that appear for your NIC.

You can also check for driver updates at the NIC manufacturer's Web site. Point your browser to that site and look in the support



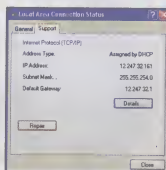
If you don't know the exact make and model of your network adapter, check the card's description in the Windows Device Manager.

and downloads areas for the latest driver updates for your particular NIC. If you don't know which model you are using, right-click the My Computer icon on your Desktop, click Properties, and select the Hardware tab. Click the Device Manager button and then double-click the heading marked Network Adapters to see the full name of your model NIC.

Once you find the latest drivers for your NIC, download and install them per the instructions on the manufacturer's Web site. Reboot your system after the installation (you may be prompted to do this anyway) and see if that helps or corrects your connection problems.

■ Do It Yourself. If none of these steps improves your broadband connection problem, there is still one more thing you can try before you turn to the outside world for help. If you are using Windows XP, you can bring up a utility that "repairs" your network connection with the click of a single button. In reality, this feature simply refreshes your network information, which in some cases can kick-start a stalled connection. It doesn't always work, but it is worth a try.

To use the Repair feature, bring up your network connection properties by clicking Start, selecting Control Panel, and clicking Network And Internet Connections. Next, click Network Connections and double-click the icon for your broadband Internet connection. This will bring up a small window labeled Local Area Connection Status. Click the Support tab and you will see a button marked Repair. Click this to refresh your network information.



Windows XP offers a Repair feature that, in some cases, can correct glitches that have corrupted your broadband connection.

The process should be almost instantaneous and it should produce a message stating "The Repair Operation Completed." If it takes longer than a few seconds and returns a different message, you may have a network problem that lies somewhere along the line between your computer and the ISP.

Note that if you are not using WinXP, you may still be able to use a similar feature. On older versions of Windows, click the Start button and select Run. In the field, type winipcfg and click OK. This will bring up the Windows IP Configuration utility. Click the Refresh All button to refresh your network connection information and then exit the utility to see if your connection is working again.

■ Confirmation Of Speed. As we have already discussed, if your line is completely dead and you just can't do anything on the Internet at all, the problem almost certainly lies somewhere outside of your computer and your home or office. However, many broadband users run into intermittent problems that seriously degrade the performance of their supposedly high-speed DSL and cable lines without completely shutting down Internet access. You may still need the help of your ISP to correct these issues, but there are a few Web-based tools that can at least help you track down and pinpoint the root of the problems.

Test the line. If your high-speed line is suddenly limping along more slowly than it should, you can test the quality of your connection by visiting the

Broadband Reports Web site (<http://www.dslreports.com>). This site used to be called DSL Reports, as you might notice from the URL (uniform resource locator), but it services so many users of both cable and DSL Internet services (as well as some higher-speed T1 users) that it eventually changed its name.

The site is independently run and serves as a repository for information on broadband connectivity options available throughout the United States. Users from all over the country log in to the site to test their connection quality and, from time to time, write a short summary of their personal experiences with and opinions of their current ISP. This is how the site

began, actually: It was a source of word-of-mouth information on broadband ISPs around the country, which site visitors could peruse in order to learn more about an ISP before signing on for service with them.

The test run. Today, the most popular attraction of the Broadband Reports site is its



You can see how well your broadband connection is performing by visiting the Broadband Reports Web site (<http://www.dslreports.com>).

suite of line-testing tools and utilities. Chief among these is the Speed Test, which you can access by first clicking the DSLR Tools link on the main menu and then clicking the Speed Tests button in the lower half of the page. Read the description of the test on the subsequent page and then click a server name to begin the test.

A new page will load with a Java-based utility toward the bottom of the display. Click the Run Test button on that utility to begin the test. You can also check the box marked Verbose if you would like to see a running litany of test results as the process unfolds. When the test completes, you will get a brief summary of your line's speed, including the relative speed of your broadband connection compared to a 56Kbps (kilobits per second) modem connection.

To see more information, click the Graph Results button. On this page, you can also enter a bit more information (just your ZIP code and the name of your ISP) and choose to have the data logged along with your test results. This data is then added to the site's voluminous database of ISP test results, which can be searched for nationwide and regional averages.

What does this information do for you? If your line is working well, it can really boost your feeling of self-worth, especially when you see how well your line speed compares to the other, much slower types of Internet connections currently available. If your line did not test well, however, you will have a set of test

results that you can print out and fax to your ISP as proof that your broadband connection is not operating up to snuff.

In some cases, this may very well be called for, especially if your ISP advertises a particular speed as part of your subscription. Even if you are not engaged in heated debate with your ISP, however, the Speed Tests at Broadband Reports can be a great way to periodically evaluate the performance of your connection and to make sure everything is working as it should.

■ Beware The Tweaks. The Internet is awash in utilities and tools that supposedly accelerate broadband connections and improve your Internet performance. Most of these tweak your Windows Registry settings to let your computer send and receive data over the Internet in a slightly more efficient manner. Generally speaking, there is no harm in this, but any time you start tinkering with the Registry you open yourself up to serious problems. One mistake in the Registry and you could be looking at a complete system

failure. Our advice, if you are considering using one of these accelerators, is to back up your entire system first, in case you need to restore all of your critical data after a catastrophic system failure.

■ Out Of Your Hands? The thing to keep in mind while troubleshooting your broadband connection is, quite simply, that nine times out of 10 the critical problems will be beyond your control. Even if your system is in perfect working order and your ISP is pumping data along at a fine clip, any number of things can crop up out on the Internet to disrupt service for you, your ISP, and thousands of other users.

The best strategy is to make sure that everything on your end of the connection is working properly and is up to date so that you get the most out of your broadband connection when it is functioning properly. **LS**

by Michael E. Ryan

Has Your Router Been Compromised?

With the benefits of an always-on broadband connection comes vulnerability to malicious attacks by viruses, worms, and other crippling concoctions of computer code. If you suspect that your network connections have been infected by a worm, such as the much ballyhooed NIMDA worm, there are a few steps you can take to minimize the damage and to help ensure that you don't get victimized again. Some symptoms include overall decrease in system performance, degradation of Internet connection speed and automatic (and repeated) power cycling of the computer itself.

Basically, it keeps rebooting itself without your say-so.

For starters, you should always use firewall and antivirus software when using

a broadband connection. All-in-one suites, such as Symantec's Norton Internet Security 2002 (<http://securityresponse.symantec.com>), are a great way to protect your computer from attack by worms and viruses. If you don't have such software in place and suspect that you have been the victim of a malicious Internet attack, your options are limited.

You should, at the very least, purchase a good firewall and antivirus package. It may be too late to avoid damage from the attack, but you may be able to at least cleanse your system and save your most important data.

If you do have firewall and antivirus software installed, make sure that you keep it up to date, even if that means buying a new

update subscription from the software manufacturer each year. With this software in place, you are in a good position to stop attacks before they can do any serious damage.

Also, you should check the Web site of your router manufacturer for the latest information on vulnerabilities to viruses and worms and steps you can take to defend against attack. Cisco (<http://www.cisco.com>), for example, has an extensive online database of information and product update alerts. Symantec, on the software side, also maintains an impressive library of reference material (<http://securityresponse.symantec.com>) that can help keep you informed and keep your Internet connection as safe as possible. **■**

Without A Sound

What To Do When Your PC Doesn't Speak Up

We demand so much from our computers. With every upgrade we anticipate faster processing, more vibrant colors, and more dynamic sound. Heightened expectations result in heightened demands: Why is it taking so long? Why is the picture so pixilated? Hey, my computer just booted. I didn't hear the "Tada."

Sometimes it seems as if any change to a computer (adding a new device, a new program, or even just turning it on) can cause it to lose the ability to produce sound.

■ An Earful. Lack of sound from the computer will often cause an increase in sound from the user. Turn your personal volume level down and read the answers to these problems. Chances are you will find beautiful music there.

Problem: I could hear Britney Spears yesterday, and now she won't cooperate. Did I do something stupid?

Solution: It's probably a simple error with a simple answer, and no, you didn't do something stupid. The mistake is not stupid, but how you go about solving it can be. Check the simple stuff first. The most common problems usually have the easiest solutions.

Begin checking connections. Are the speakers plugged firmly into the sound card and into each other? An errant foot or pet can pull that cord over ever so slightly and put your PC into mime mode.

Are the speakers plugged into the speaker out or line out port? Sound cards usually have two choices. If you don't see the words "line out" or "speaker out," look for the image of an arrow coming out of a group of parenthesis.

Are the speakers getting power? Not all speakers need a power source to operate, but most do and most have an indicator light, letting you know that power is coming through OK. If the power light is not on or there isn't one, check to make sure the speakers receive



power from a wall outlet or fresh batteries. If you think the speakers may be the problem, plug in a set of headphones to the sound card's out port and see if you can hear through them.

Problem: Everything's connected and powered, but there's still no sound. I'm sensing that Britney doesn't like me.

Solution: Is the volume turned up? Check the dial on your speakers, and if you have an old sound card, you may find a volume dial there, too. If those are OK, chances are the sound levels under your Windows Volume applet have been turned down or are muted. Look in the bottom-right corner of your screen in the System Tray and double-click the speaker icon. Windows XP users may need to click the System Tray's left arrow to see the speaker icon. Move all sound levels to more than halfway up and uncheck any boxes next to Mute.

Problem: Wait a second. Speaker icon in my System Tray? I don't have one.

Solution: It's possible the Volume Control application is corrupted or, in some weird way, was uninstalled. Windows 9x/Me users need to reinstall the program by selecting Add/Remove programs from the Control Panel. Select the Windows Setup tab, double-click Multimedia, and make sure to check the Volume Control checkbox. You may need

your Windows Installation CD. Make sure it's handy.

Instead of reinstalling the Volume Control program, WinXP users need to open the Sound Control Panel, select the Volume tab, and make sure that Place Volume Icon In The Taskbar is checked.

Problem: OK, volume is up, everything's connected and receiving power. Britney still won't sing anything. I think I've angered her.

Solution: If there's still a problem, make sure your PC recognizes your sound card and that it's the default device. Click Start, Settings, Control Panel, double-click System, and then select the Device Manager tab. (WinXP

users can go straight to the Control Panel from Start. Once there, click Performance And Maintenance and then System. Click the Hardware tab and then Device Manager.) If the sound card is the problem, the Sound, Video And Game Controllers section will automatically expand and one or more of the devices will display a yellow circle with a black exclamation point (!). Double-click the indicated device. There will be a short explanation of why it's not working. To solve the problem, click the Hardware Troubleshooter button and follow the steps to isolate and remove the problem.

For WinXP users, you'll also have to make sure your audio device is the default. Click Start, Control Panel, Sounds, Speech And Audio devices, and Sounds And Audio Devices. Click the Audio tab and make sure your sound card is selected as the default device for sound playback. If not, select it.

Problem: I used to have it so Star Trek's Capt. Picard would say, "Make it so," every time I launched a program. Where did he go?

Solution: All the cool sounds you hear when you use your computer are known as sound events. Each action, opening an application, for instance, can be associated with a sound. A whole group of actions with related sounds is known as a sound scheme.

Win9x/Me users click Start, Settings, Control Panel, and then Sounds. For WinXP users, once you're at the Sound Control Panel, select the Sounds tab. You see a list of events and most should have speaker icons next to them. If you don't see any speaker icons, or the one you want, such as Open Program, is missing, then you need to add a sound. Select the event and click Browse. Find the WAV file you want associated with that sound event and click OK. You'll see there's an option to preview the sound to make sure you have the right one.

If there are no sound icons and the Schemes box is blank, or it says no sounds, select another scheme in the drop-down list, such as Windows Default. Windows will ask you to save the current scheme. If you didn't create one, just click No. If you did, go ahead and click Yes, type a name, and save.

Problem: I'm getting weird, erratic, and inconsistent sounds from games and different CD-ROMs.

Solution: Sounds as if you need a new driver. A device driver is a critical file that translates instructions between the PC and a device, such as a sound card. Drivers, similar to any file on your computer, can become corrupt. If so, the device won't work.

If you installed a new program, it's possible the program is trying to send new instructions to your sound card that aren't in the driver's old library. If that's the case, your driver may behave flaky with erratic sound. Go to the sound card manufacturer's Web site and download the latest driver.

If you're still having problems after you've installed and reinstalled all these drivers, you may have accidentally exacerbated the problem and confused Windows by installing multiple drivers for the same device.

Under the Device Manager, double-click DVD/CD-ROM Drives, Display Adapters, and Sound, Video And Game Controllers. See if any of the drivers are duplicated and, if so, check the properties of each. If there's one that says it's not working because of a conflict, remove it.

Problem: I've installed the latest drivers for my sound card, but I still can't hear sound from my new CD-ROM game.

Solution: Instead of sending device-specific instructions to your sound card, the game is probably using DirectX. DirectX is a standard Windows interface that lets you use high-end multimedia capabilities irrespective of the peripheral's model. It's possible that

your sound card may not support DirectX's DirectSound acceleration.

You can test this with the DirectX Diagnostic Tool. Click Start, Run and type `dxdiag` in the Open field. Click OK. Select the DirectX Files tab, and you'll see a list of files. If there are no problems with the files, it'll say No Problems Found in the Notes box.

Click the Sound and Music tabs and look at the Notes box. See if there are any errors reported. You'll see options to test DirectSound and DirectMusic.

You may need to lower acceleration on Sound if there are any problems. If there are still problems, go to Microsoft's site (<http://www.microsoft.com/directx>) and download the latest version of DirectX for free.

Problem: I've plugged my MP3 player into the PC, and I can't hear anything.

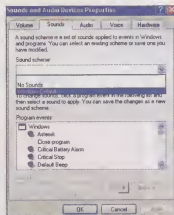
Solution: You need to connect the MP3 player to the sound card. The USB (Universal Serial Bus) connection is only used to transfer files. It's not used to deliver sound. You need to connect the MP3 player's speaker or out jack to the sound card's line input.

Problem: Audio over the Internet is inconsistent.

Solution: If you get a "can not locate" error message immediately upon launching a streaming audio file, chances are the file is no longer available. If the file is available and your player crashes, you need to upgrade or reinstall the actual player. Most streaming players, such as RealPlayer (<http://www.real.com>), Windows Media Player (<http://www.microsoft.com/windowsmedia>), and QuickTime (<http://www.quicktime.com>), are free and waiting to be downloaded.

Internet audio can also suffer from 'Net congestion. You can tell if your problem is with the connection if there's no buffering or the audio hangs during playback. Dial-up connections at 56Kbps (kilobits per second) speeds make listening to streaming audio even more difficult especially if you're trying to browse the Web at the same time.

If WinXP users get an error message that says, "No audio hardware is available" or



Not hearing any sounds while you are working? Select a scheme, such as the Windows Default scheme, and sounds will accompany certain events.

"Hardware is not responding," your sound card probably can't handle full hardware acceleration. If so, you'll need to reduce the acceleration. In the Sound Control Panel, select the Audio tab and click Advanced in the Sound Playback section. Click the Performance tab and move the Hardware Acceleration slider one notch to the left. Click OK and OK again.

Problem: I sound like a Ham Radio operator with a bad radio when I use Internet telephony.

Is it supposed to sound like that?

Solution: No. First, turn your speakers down. A hot mike with live speakers will produce feedback and make the Internet telephony experience miserable. Improve sound by turning the speakers off and using a headset. The headset plugs into both the microphone and an out or speaker port, letting you talk and listen.

Double-check the connections and do some test recordings with Microsoft's Sound Recorder. If the test recordings play back and sound fine to you (remember nobody likes the sound of his own voice), you're good to go.

Internet telephony products, such as NetMeeting, have wizards that test recording levels. Make sure you run that before you begin your online chat.

■ **Check, Check.** Troubleshooting sound is just a process of stepping through the most common problems first. A rebooting, new driver installation, or check of connections and sound levels usually solves most sound issues. When that doesn't work, it's important to have a good understanding of how different applications receive and send sound. For example, CD-ROM games manage sound much differently than streaming audio. If you know what application is trying to play the sound, you know where the problem lies.

The fault lies with the application's communication to your sound card and speakers. Whatever you do, don't blame Britney. [S]

by David Spark

No Tunes

My CD Player Won't Play Music CDs

Music soothes the savage beast. Take it away, and what have you got? A beast that's not only savage but also agitated because his tunes are gone. Not that you'd become comparatively irate should your PC's CD player refuse to play, but if it suddenly stops and you can't hear that CD you crave, remain calm and try a few basic moves to get yourself humming along again.

■ **Keep It Clean.** Before assuming the worst, it's best to eliminate the obvious reasons your audio CD might not play. Although these silver discs are more durable than their predecessors (cassette tapes and vinyl), everyday wear and tear has been known to interfere with the listening experience.

So first, check for scratches, smudges, or dirt. Clean away any surface matter using a nonabrasive cleanser and a cotton cloth. Gently wipe the CD in a direct line from its center to the outer edge. If the CD has minor scratches, try buffing them out with a small amount of baking soda, toothpaste, or furniture polish (continuing to wipe only straight from the center of the CD out to the edge). If that fails and you're certain a scratch is the cause of your trouble, try a repair kit from your local computer retail shop (and be grateful the problem is on your CD and not in the system settings or CD drive).

■ **Tuned In, Turned On, Hooked Up.** If your CDs are clean and undamaged, check your PC's various volume settings. First, confirm that the speakers are turned on. If you have add-on speakers, make certain they're plugged in to your PC securely and in the correct port. Also, see that the volume control is at the appropriate level.

Next, check your system's Volume Control settings by double-clicking the speaker icon in the System Tray to open the Master Volume (sometimes called Volume Control) window. Use the sliders to increase or decrease the Volume settings in the CD Audio



and Master Volume columns and verify that the checkbox next to Mute is cleared.

If you are unable to hear any sound through your headphones and you use WMP (Windows Media Player), you may need to disable the Digital CD Audio Setting. This feature is turned on by default to let your CD drive play digital devices, such as USB (Universal Serial Bus) speakers. If left on, it may interfere with playback to your headphones because, although WMP does use digital playback, the headphone jack on the CD drive doesn't in many cases and is live only during analog playback.

To disable the Digital CD Audio Setting in Windows 98/Me, click Start, point at Settings, and select Control Panel. Double-click the System icon and select the Device Manager tab from the System Properties window. (In Windows XP, click Start, Control Panel, Performance And Maintenance, and System. Select the Hardware tab and click Device Manager.) Double-click the CDROM selection (DVD/CD-ROM Drives in WinXP), right-click the CD drive, and select Properties. In the new window, select the Properties tab, clear the checkbox next to Enable Digital CD Audio For This CD-ROM Device, and click OK.

Select Options from the Tools menu to disable the Digital Audio setting inside WMP. Click the Devices tab, highlight the CD Drive, and click Properties. A new CD Drive Properties window will open. Under Playback, select Analog and click OK.

■ **Who's Driving This Thing?** If you've come this far, the problem is obviously more complex than volume or digital settings, speaker configurations, and scratched CD surfaces. It's possible the problem is related to the CD drive and sound card drivers.

To check your drivers, access the Device Manager and click the plus sign (+) next to Sound, Video And Game Controllers to expand the folder and view the entries. Right-click the entry for the sound card driver and select Properties. On the General tab, confirm that the Device Status displays This Device Is Working Properly. If a message to the contrary appears, click the Troubleshooter button to access the Help and Support Center (WinXP) or the Hardware Troubleshooter (Win98) for step-by-step guidance to correct the problem.

Back in your sound card's Properties window, select the Driver tab and click the Driver Details button to compare your system's driver files against those on the CD the manufacturer supplied. If you do not have a CD with your hardware's drivers, contact the manufacturer or check its Web site for support. If you locate a discrepancy, click OK and select the Update Driver button to access the Upgrade Device Driver Wizard, which will guide you through the process to update your hardware.

■ **Let's Get Physical.** If all else fails, you may need to check the physical connection from your CD drive to the sound card itself. Always be sure to shut down power to the PC and ground yourself before removing your PC's cover. Once it's removed, locate the sound card and CD-ROM drive and make sure the cables are securely connected at both ends. If all connections are secure, you may have a damaged sound card or CD drive on your hands. Contact the hardware manufacturer or your local repair shop.

■ **Keep The Tunes Flowing.** For many of us, our PC's CD player is the saving grace of an otherwise dreary day of piled-up paperwork, intrusive e-mail, and irritating editors. An interruption in playback can be disturbing. But when the tunes stop crooning and you feel that inner beast emerging, you'll likely pacify it with a quick cleanup, a trip to your operating system settings, or a driver update. [E]

by Linda Rains

Game Over...Or Is It?

Stay On Top Of Your Games



tweak a number of key settings on your computer and get most games working. All it takes is a little patience. OK, sometimes it takes a lot of patience.

■ Don't Always Believe What You Read.

It may seem obvious, but the first thing you really need to check when a game fails to work properly is the general state of your hardware configura-

tion. Scan the game's packaging for a list of the minimum hardware specifications required to run the software. Does your system meet these requirements? Better yet, does it exceed these requirements by a vast margin?

If you said yes to the former but no to the latter, you may be in for a huge disappointment. Sadly, the hardware requirements listed on most games' boxes and jewel cases are misleading. Especially on 3-D, resource-intensive games, such as *Medal of Honor: Allied Assault* and *Jedi Knight II: Jedi Outcast*, the specifications listed as minimum are usually barely adequate to run the game at all.

You are better off having a faster CPU, more memory, more free hard drive space, and a better graphics card than what you see listed on that box. In fact, if your game lists two configurations on the packaging, one marked Minimum and one marked Suggested, your best bet is to have a machine that is closer to the Suggested level. If you notice

that your system consistently fails to meet the minimum specifications required to run most new games, it is time for you to consider a system upgrade.

■ **Get Up To Date.** If your machine has the muscle to adequately run the game that is causing you problems, the next thing to check is the game itself.

Frequently, computer games are updated by their developers even as copies of the game make their first appearance on store shelves. This is known as patching, as players are asked to download and install a software update (or patch) that corrects bugs and other issues with the game.

Patches for some games are usually available the very day that the game is released, so you should always check the developer's Web site for the latest news. To make this process easier, some games will provide an update button right on the launch menu used to run the game. You will notice this especially in online-only games, such as *EverQuest* and *Dark Age of Camelot*, which require all players to have the same version of the software before letting them onto the gaming network.

One thing to note when looking for patches is the sheer size of some game updates. Like it or not, an alarming percentage of games are simply shipped before they are ready for prime time. This means that many games require significant patching before they run at all, let alone run well and as they were intended.

Also, patches are not always used solely to fix problems with a game. Sometimes they add a great deal of content, such as new features, new environments to explore, and quite possibly new artwork and new sound effects. All of this adds to the size of the patch, and it is common to find patches weighing in between 5MB and 10MB in size. Some balloon out to 30MB or 40MB, in fact. Such file sizes may not faze broadband users, but dial-up users on a 56Kbps (kilobits per second) line are in for a long night of downloading if they plan to grab a 40MB file off of the Internet—and all for a game that really should have worked properly when they first brought it home.

■ **Drivers, Drivers Everywhere.** Even if no patch exists for your misbehaving game, or if you have already installed a patch and the game still refuses to work, you may be

With the possible exception of the OS (operating system) itself, computer games are the most finicky and misbehaved type of software you could load onto your PC. Crashes, quirky performance issues, and a general failure to execute properly are the all too common side effects of trying to install and run the latest and greatest games.

The reason for these problems is fairly simple: Computer games push the limits of current PC technology as far as it can possibly go. Add to that the fact that PCs come in such vastly different configurations, and you have a compatibility-testing nightmare. Simply put, it is impossible for any computer game developer to verify that its latest creation works perfectly on every possible PC configuration. Therefore, you are bound to run into a game or two that absolutely refuses to work on your particular setup.

You need not give up hope, however. Generally speaking, you can update, adjust, and

able to correct your problems by updating your device drivers.

Drivers are simply the software Windows uses to access and control the various hardware components in your computer. Your graphics card, for example, has a specific set of software that governs how quickly and efficiently Windows can use that card to draw images on the screen.

Because computer games are generally developed on cutting-edge systems for cutting-edge systems, they often rely on the most up-to-date drivers available at the time of the game's release. If you don't update your drivers often (or ever), chances are that they could be the root of your problem.

Your first step in updating drivers is to visit the hardware manufacturer's Web site. If you want to find the latest drivers for a SoundBlaster Live! sound card, for example, you would go to Creative Labs' Web site (<http://www.soundblaster.com>) and click the Drivers button that pops up when you highlight Downloads in the menu. You will then see a list of available drivers, typically sorted by date of release and OS.

Make sure to download the most current release and that the driver is for your version of Windows. If you mistakenly install a Windows XP driver on a Windows 95 machine, you could cause more problems than you had before.



In some games, such as *Serious Sam*, you will have an option to update the software right from the game's main launch menu.

With graphics cards, take note of the manufacturer of the chip on which the card is based. You can usually find this information in your system documentation, the box in which you bought the card, or the Windows Device Manager. If the chip manufacturer is NVIDIA, for example, you can always visit its Web site (<http://www.nvidia.com>) and download the latest drivers for your graphics card, even if the card itself was produced by another company that licenses the NVIDIA chips. In fact, the

drivers provided by NVIDIA (and other chip makers) are generally the best available, even if the card makers have different drivers available on their own Web sites.



If you are having trouble with game software, check that game's official Web site to see if any updates or patches have been released.

Not-So-DirectX. Microsoft's DirectX is a set of software drivers and technologies that games rely upon to run on all versions of Windows. The software is built into the Windows OS, but DirectX is updated frequently. As with individual hardware drivers, most new games take advantage of the latest version of DirectX to deliver better, faster, and more impressive visuals and gameplay. An out-of-date version of DirectX, therefore, is a potential culprit behind any gaming problems you might be having. It is not, however, a very likely one.

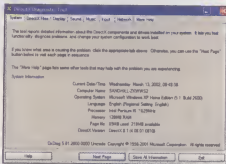
Most new games reinstall DirectX when you first load them onto your hard drive. With early versions of Windows, this caused all sorts of problems as the DirectX installation was poorly implemented and often overwrote more current files with older, out-of-date ones. Now, the DirectX installation, which is the same in any game because the DirectX installer runs independently of the game installation, is much smoother and more advanced. It will offer you the chance to skip the DirectX installation entirely, and it will always leave the most current DirectX files on your system, even if you mistakenly choose to reinstall the software when you are fully up to date.

For these reasons, you are not likely to have a bad copy of DirectX if you install and run games on a fairly regular basis. If you just want to make sure, however, you can always download the latest copy of the full DirectX installation at Microsoft's DirectX Web site

(<http://www.microsoft.com/directx>). Alternatively, you can simply plop the CD for your most recently released game into your CD-ROM drive and explore the disc. Look for a folder named DXSetup. Open this folder and double-click the icon labeled Dxssetup.exe. This will launch the DirectX setup utility and install the latest version of the software on your system.

Too Many Cooks. If none of these steps corrects problems you are having with a game, consider a few alternatives. First, the game itself may simply be too bug-ridden and flawed to work properly. Sadly, this is hardly an unknown occurrence in the gaming industry. Second, the game may be conflicting with another game's software requirements. For example, one game you bought last week may require version 9 of a particular company's device driver. Another game you bought yesterday may require version 10 of that same device driver—only, the first game doesn't work correctly when version 10 is installed. Again, this is a common problem with game software, and there is very little you can do to correct it on your end.

Finally, if all else fails, head online to Web sites devoted entirely to the game that is



Updating your drivers is a continuous process. Just when you have everything up to date, a next-generation game, such as *Unreal 2*, will force you to update all over again.

causing you problems. Check the documentation that came with the game or the Readme.txt file that is installed in most game directories for the name of the game's Web site and look there for discussion forums where other players might be able to offer advice on correcting your problem.

You won't always find the answers you need, but it never hurts to look. [E]

by Michael E. Ryan

I Thought I Pushed Record

Sound Recorder Problems & Solutions

Windows is packed with all manner of utilities and applets, a handful of which pertain to audio. Among these, Windows Media Player comes to mind first. Last on the list, if it gets remembered at all, is the Sound Recorder.

This humble program, located by clicking Start, Programs, Accessories, Entertainment, and Sound Recorder, simply does one thing: record WAV files. Unfortunately, Sound Recorder, similar to practically all software, suffers from its own share of glitches. We've unearthed some of the more common problems and offer solutions for them here.

Common Problems. WAV, Windows' native recording format, is a file type that, unlike MP3 or WMA, does not use compression and thus offers an exact digital rendering of the original analog audio. When you rip tracks from a CD or record audio with a microphone, the results are often saved as WAV files. Sound Recorder is a handy tool for recording audio from an external source as well as performing very basic edits and mixes of existing WAV files.

Problem: I clicked the record button, but it doesn't seem to be recording any sound. The little green line doesn't move, and when I play the recording back, there is only silence or a faint buzzing sound.

Possible Cause: You might not have your Record Properties for your sound system set up correctly in Windows.

Solution: Double-click the speaker icon in the System Tray to check your settings. In the window that appears (typically named Volume Control with a bunch of volume sliders in it), click the Options menu and select Properties. The Mixer Device field shows the name of your sound card. Below this, you will see three options to choose from: Playback, Recording, and Other. Select Recording. In the box below will appear a

list of potential audio sources with check marks next to the ones you want to have available. Make sure that the device that you want to record from, such as the Microphone or CD Player, has a check mark next to it. Now click OK.

The window that now appears looks just like the Volume Control window, but if you look carefully at the title, you'll see that it's called Recording Control. The sliders control the input sensitivity of each device. Below the sliders is a checkbox. Typically, only one device at a time can be selected. To record from a device, put the check mark in the box below this device. Now when you record, it will pick up sound from this source.

Problem: When I play back the recorded sound, it is too quiet and fuzzy or too loud and distorted.

Possible Cause: The recording volume level for your recording source is set too low or too high.

Solution: Open up the Recording Control window (as mentioned previously) and adjust the volume slider level for the device from which you are recording. If the sound is too quiet but the volume is all the way up, try recording from a different source.

For example, plug your microphone into the Line In jack (if your sound card has one) or look for hardware that works better with your computer. Some professional-style microphones do not perform well when they are connected to a computer, and you might need to purchase one specially designed for PC use.



Problem: The system seems to record properly, but replayed audio sounds fuzzy, distorted, or muddy.

Possible Cause: The codec (compressor-decompressor algorithm) you are using is inappropriate for your needs or its settings need to be adjusted.

Solution: When Sound Recorder records, it uses a codec to encode the sound into a digital file. You can select which codec you are using by clicking File and selecting Properties. In the Choose From drop-down list, select Recording Formats and click Convert Now. You can select this even if you haven't recorded anything yet.

The Format drop-down list shows your available codecs, and you can select codec settings in the Attributes menu. For general use, the default code is PCM (pulse code modulation). This gives you uncompressed sound, which means maximum sound quality (when your options are set correctly) with the largest file size. If you eventually want to burn your sound onto a CD as CD Audio, use this codec.

At the top of the window, you will notice a Name drop-down list. These names are customizable default settings for certain uses. CD Quality is the setting to choose if you want to create audio to be burned onto an audio CD. Radio Quality is noticeably less crisp sounding but creates a much smaller file. Telephone

Quality sounds fuzzy but uses even less disk space. The Name list is customizable. If you find a codec and setting you like, click the Save As button to save it on the list for next time.

Returning to the original problem, fuzzy sound is probably caused by the codec Attributes being set for low quality sound. Try selecting a higher bit rate (16-bit is better than 8-bit) or frequency (22KHz is better than 11KHz). If you are only recording voices, mono sound should be fine, and this will cut the file size in half.

On the other hand, if you are recording music or sound effects, you will probably want stereo sound. Try recording several sessions with different settings to see how the bit rate and frequency selections affect the sound.

Feel free to experiment with other codecs on the list besides PCM. Each codec uses a different algorithm to save audio and some will give better quality sound, lower file sizes, or both.

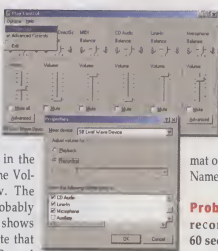
Be aware, however, that if you create a non-PCM audio file, other people might not be able to play it, especially those with different OSes (operating systems). If you want to be able to share your sounds, always save WAV files in PCM format. For more information about some of the codecs available, go to the Microsoft Knowledge Base at

want. (Alternately, no sound comes out the speakers when I want it to.)

Possible Cause: The volume settings for the Microphone are incorrect.

Solution: Double-click the speaker icon in the System Tray to open the Volume Control window. The recording source is probably one of the sliders that shows up in this window. Note that the settings in Volume Control are completely independent of the Record Control window. If you want to hear what you are recording, you need to make sure that the Microphone or other appropriate source is not muted, then slide the volume slider for that device until it is at a comfortable level. Don't set this too high or you might get feedback through your sound card when the sound from the speakers is picked up by the microphone. Of course, if you don't want to hear the sound, just mute the slider for that device.

If you don't see your recording source among the various sliders, you might have to force it to appear. Click the Options menu and Properties. Select Adjust Volume For Playback and see if your recording source is in the list at the bottom of the window. If so, put a check mark next to its name and click OK. It should now appear in



Simple yet effective, this is Sound Recorder at rest. Buried within this little application are the abilities to mix audio files, reverse play, add echo effect, and more.

an uncompressed format or select a scheme from the Name drop-down list.

Problem: The maximum recording time is only 60 seconds.

Possible Cause: Sound

Recorder is only able to record 60 seconds of audio at once.

Solution: This is a tricky one. Unfortunately, there doesn't seem to be any setting you can change to remove this limitation. However, you can fool Sound Recorder into accepting a file that is longer than 60 seconds.

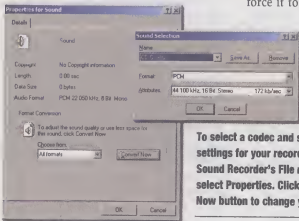
To do this, first record 60 seconds of silence, making sure to use an uncompressed codec, such as PCM, in your preference settings. Next, save this audio as a file, for example 60sec_blank.wav. Then insert the file you just saved into your audio session by selecting Insert File from the Edit menu. This inserts 60 more seconds into your session, giving you 120 seconds of elbow room.

If you need more, just keep inserting that same file until you have the length you are looking for. Save your finished product with a different name so you can use it later. If you drag the timeline slider back to the beginning and click the record button, it will start recording audio over the top of your silence.

When you are finished recording, you will likely have some space left at the end. Leave the slider where it is and select Delete After Current Position from the Edit menu to trim the excess off the end.

■ Sound Off. Although Sound Recorder is limited in scope and power compared to the many commercial audio-editing packages on the market, the application does a fine job with basic audio recording and simple effects. Best of all, Sound Recorder is free and included with every version of Windows. So even if you're using a strange PC, you'll never get caught without the ability to capture and convert audio. **[E]**

by William Van Winkle



To select a codec and sound quality settings for your recording, go into Sound Recorder's File menu and select Properties. Click the Convert Now button to change your codec.

[Also know that you can convert a high-quality sound file to a lower-quality sound file using the Convert Now button. However, if you originally recorded at a low bit rate or frequency, converting the file to a higher setting won't significantly improve the sound.](http://support.microsoft.com and type Q142745 in the Search field.</p>
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Problem: The microphone's (or other recording source's) sound comes out through the speakers, but this isn't what I

won't let me delete sound files.

Possible Cause: You are working with a compressed sound file, which Sound Recorder can't edit. You will know this is the case if there is no little green line in the black box in the center of the Sound Recorder window.

Solution: Use the Convert Now utility to convert to PCM or another uncompressed format. Click File and select Properties. Click the Convert Now button to view the format selection window. In the Format menu, select

Media: MIA

Download These Programs To Cover Your Media Bases



Right out of the box, most new Windows PCs provide a wealth of multimedia capabilities that let you watch video clips and listen to music. Even most inexpensive computers, after all, come equipped with moderately powerful graphics adapters, sound cards, and speakers. Additionally, whether a computer runs Windows 98, Me, 2000, or XP, it already has the software to play audio and video files in Windows Media Player.

However, you may run across some audio and video files on the Web that your computer cannot play, at least not without some additional software, such as Apple's QuickTime or RealNetworks' RealOne, in place first.

In this article, we will address these and other multimedia applications, how to get your hands on them, why they aren't included in Windows

to begin with, and how to make sure they don't cause more problems than they solve.

■ **Apple QuickTime.** QuickTime is Apple Computer's technology for compressing and storing digital video files. It is also the name of the application required to play back and view these files, which are easily identified by their .MOV extension.

Most PC users won't even notice that they cannot use files of this type until they try to view a film trailer at Fandango.com (<http://www.fandango.com>) or some other Web site that is devoted to movies. Windows Media Player does not support the MOV file format, and Internet Explorer does not include a plug-in for it. So, by default, most Windows PCs are not able to open QuickTime MOV

files unless the QuickTime player is first downloaded and installed.

How to get it. You can get the QuickTime player for free at its Web site (<http://www.quicktime.com>). Once on the QuickTime home page, you simply click the download button, check the appropriate boxes and begin the download and installation of the software.

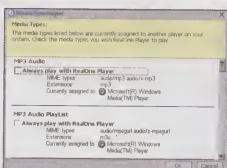
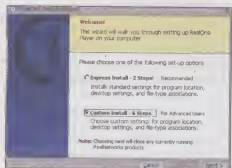
At the time of this article, the most current version of QuickTime was QuickTime 5. Older versions of the software sometimes caused problems on Windows PCs because they seized control of some media types. Basically, once installed, QuickTime would try to act as the default player and viewer for every type of multimedia file the software could handle. So in addition to MOV video clips, QuickTime would also become the default viewer for all of your GIF (Graphics Interchange Format) and JPEG (Joint Photographic Experts Group) images and would play all of your AVI (Audio-Visual Interleaved) video files as well.

Thankfully, QuickTime 5 is a much friendlier version. So much so that if you are running into problems with an older installation of QuickTime, you can probably correct them with an upgrade to version 5.

Conform to you. The key to getting QuickTime to work perfectly, in fact, is to pay close attention while installing the software. The simple routine will prompt you for input a number of times and will not do anything that you don't give it explicit permission to do. For example, the software will ask you if you wish to install a browser plug-in version of QuickTime, tell you which browsers you currently have installed, and prompt you to select the ones for which the plug-in should be installed.

More importantly, at the end of the installation, QuickTime will ask you which media types you wish the software to run by default. Unless you have some reason to use QuickTime for viewing GIFs and JPEGs, you should leave the default selection in place, which is for QuickTime to only handle Macintosh file types. This lets QuickTime run as intended, handling all MOV files (and QuickTime movie trailers) you run across but without interfering with the day-to-day duties of other multimedia applications currently installed on your system.

Change in store. If you run into problems with QuickTime movies after installing QuickTime 5, you can try changing your connection speed settings in the software. From the QuickTime program menu, click Edit,



If you decide that you do not want RealOne Player to take control and become the default player for your various media file types, make sure you choose Custom Install from the setup menu (left). That way you can manually select and deselect the media types that you want RealOne to play.

select Preferences, and then choose QuickTime Preferences. From the drop-down menu, select Connection Speed and choose the option closest to your Internet connection capabilities. Cable and DSL (Digital Subscriber Line) users have multiple options here. If you're unsure how fast your broadband connection is, try using one of the slower settings, such as 256Kbps (kilobits per second). If you are using a dial-up Internet connection, select 28.8Kbps or 56Kbps, whichever is appropriate, and then make sure the box marked Allow Multiple Simultaneous Streams is cleared.

After installing and configuring QuickTime as described, your only real issue will be dealing with the pop-up ads for QuickTime Pro, which appear nearly every time you launch the QuickTime player or click a QuickTime Web link. Unfortunately, there is no way to get rid of this unless you opt to pay \$30 for the Pro version of the software. Although this upgrade does add numerous video-editing features and other premium options, it really has limited value to the average consumer who simply wants to view the latest "Star Wars: Episode II" trailer.

RealNetworks RealOne. Many users are familiar with RealNetworks (<http://www.real.com>) because of the company's RealPlayer. This application provides the ability to view and listen to streaming media, files that can be played while they are being downloaded from the Internet, rather than those that must first be downloaded completely and then played.

Although Real's proprietary media formats were unique at their inception a few years back (especially the RealAudio and RealVideo formats), they now find themselves in a dogfight with competing formats from Apple and Microsoft. Still, a large number of Web sites

offering multimedia content do so using Real's technology.

Similar to QuickTime, the RealPlayer does not actually come installed on many new Windows PCs. Even if a version of the software is installed on your new PC, it is most likely out of date and, for the most part, useless. This is because Real has recently overhauled its RealPlayer software, adding a vast number of features and changing the name of the software to the RealOne Player.

Brimming with features, the RealOne Player is now a full-fledged competitor to Windows Media Player. Additionally, RealOne Player is an application you'll need to download in order to experience Real multimedia files in all their forms. If you don't download the latest software, you will most likely be prompted to each and every time you attempt to view a sports highlight at ESPN.com (<http://espn.go.com>) or any other streaming media, for that matter.

Installation notes. Unlike QuickTime, RealOne is a bit tricky to install without throwing all of your existing media

settings out of whack. Things start off well enough when you visit the Real homepage and click the link marked Free RealOne Player (near the middle of the page). This will begin the installation process by downloading the RealOne Player software to your computer. It may take a while, as the download is nearly 9MB in size.

Once the download finishes, you will be prompted to choose the type of installation you wish to perform. Regardless of your computing skill, you should choose the option marked Custom Install—6 Steps. This lets you tweak the default settings for RealOne, preserving your existing multimedia file associations and eliminating any unwanted options.

You will first be asked to choose your connection speed. As with QuickTime, it is often best to be conservative here, even if you have a high-speed broadband line. The slower RealOne tries to load your media, the smoother the audio or video will play. The installation then prompts you with a number of options marked Program Location And Desktop Settings. Read these carefully and clear all of the Desktop Settings options you feel are unnecessary (for us, this means all of them).

The next step is the crucial one. In a window marked Default Media Player, RealOne tells you that it is about to become the default media player for just about every form of multimedia you can imagine. If you do not want RealOne playing your MP3 files or your audio CDs or your MPEG video clips, click the Customize button.

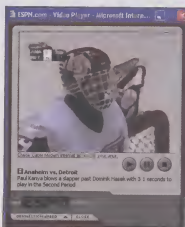
What gets played.

The Customize menu lists various media types and lets you check or uncheck them, telling RealOne to either play these media types by default or leave them associated with other applications (which in most cases will be Windows Media Player). Scroll through the entire list and make sure you have unchecked any file type that you do not want RealOne to play by default, keeping in mind that you can still manually open and play any file type through RealOne.

Also note that RealOne

will still be the default player for Real media formats such as RealAudio and RealVideo. Once you complete this configuration process, the installation will finish, and you will be prompted to reboot your system.

Final touch. Of course, you're not out of the woods yet. Once your system restarts, load up RealOne (if it doesn't start automatically)



No matter what you decide during the program's setup, you will still be able to use RealOne Player to view various streaming video clips that are designed specifically for RealNetworks' player.

and click Tools in the program menu. Select Preferences and then click Media Types on the Category list. This brings up a menu similar to the one you just configured during the installation. Scroll through it again to make sure none of your choices got lost or changed. Also note that there are a few more items on this list than you were shown during installation. Make sure you have checked or unchecked each media type according to your preferences and click OK to exit the menu.

Now the RealOne player should be all set and ready for use. More to the point, RealOne should now behave itself and only automatically play those types of files you told it to play.

One final word on RealOne: When you install the RealOne Player software, you will also update the Real plug-in for your default Web browser. This lets you view Real media files on Web sites without having to download and install any other components.

■ Macromedia Flash Player.

Flash is about as ubiquitous a beast as you'll find on the Web today. Macromedia's slick animation technology is used to spruce up menus, logos, and even entire Web sites. The Flash authoring software is powerful and, given a little patience, relatively easy to use. Fortunately for Web surfers, the Flash Player is equally easy to find, download, install, and use. In fact, the Flash Player comes already loaded in most versions of Microsoft Internet Explorer, so you may be able to experience Flash animations just fine without any need to download or install any additional software.

The catch is that most versions of Internet Explorer include a Flash Player based on Flash 4. The software has been updated twice since Flash 4 hit the scene, first with Flash 5 and most recently with Flash MX. So while you can still view a number of older Flash animations with your default Internet Explorer Flash plug-in, you may need to upgrade in order to view newer Flash content. You may even find that you encounter error messages or upgrade prompts when attempting to view a site that was developed with a version of Flash that is newer than the Flash Player you are currently using.

Thankfully, the process for upgrading is as painless as can be. Simply head over to the

Macromedia home page (<http://www.macromedia.com>), click the Downloads button on the main menu, and select Flash Player. This will take you to the installation screen that has a button marked Install Now. Click the button and wait while the Flash Player installs onto your system. This process takes all of a minute, even over dial-up connections, and then you are all set.



QuickTime, which does not come standard with your Windows OS, is handy for viewing movie trailers and other types of online video clips.

■ **Adobe Acrobat Reader.** Adobe's Acrobat Reader is one of the most useful pieces of free software available today. The Acrobat Reader lets you view and print PDF (Portable Document Format) files, which are high-resolution document files that can be viewed online or offline. PDFs are used extensively by companies that need to produce easily downloadable copies of their important corporate literature without having to convert that literature to a Web page.

For example, you may visit Philips' Web site (<http://www.philips.com>) and want to download a brochure on the company's latest wide-screen television. To do so, you will need Acrobat Reader because these, and many other types of marketing materials, are frequently provided in Acrobat format. Other types of documents you might find in Acrobat format include white papers and reprinted articles from magazine archives.

Where to get it. You can grab the Acrobat Reader at Adobe's Web site (<http://www.adobe.com>) by clicking the Get Acrobat Reader button located roughly three-quarters of the

way down the page. Follow the prompts on the subsequent pages to install the software.

There really aren't any tricks or hurdles here that you will have to avoid. The only difference between this software and the others we have addressed in this article is that Acrobat Reader installs offline, after you download the software. Simply follow the prompts to save the file to your hard drive, then find and run the software once it is completely downloaded. It automatically configures itself to run as both a standalone application and as a plug-in for both Internet Explorer and Netscape (regardless of which browser you have installed).

To it, its own. Because Acrobat Reader handles only one type of file format, its own, you don't run the risk of screwing up file type associations by downloading and installing the application.

You may want to modify one simple setting in Acrobat Reader, however. By default, the Reader plug-in opens all online PDF documents within the main browser window. This means that when you click a PDF file link, that document will load in place of the page you are currently viewing, just as if

you were switching to a new Web page.

If you would prefer to have PDF files loaded into a standalone version of Acrobat Reader, you can do so by launching the application in its standalone form. Click Edit, then Preferences from the main menu. Select Options, clear the box marked Display PDF In Browser (it is the first option on the screen), and click OK to exit.

■ **Programs Working Together.** Most multimedia file formats get along just fine with Windows regardless of which version of the operating system you are currently running. If you don't pay close attention to the way these applications install and configure themselves, you can open the door to conflicts and changes that you did not want. The key is to limit the freedom they try to assert for themselves when you first install the software. [E]

by Michael E. Ryan

DVD Difficulties

How To Handle DVD Conflicts



Nobody is going to sit at a desk and watch a movie on a 15-inch screen for two hours.

In essence, this has been the sentiment most critics aired against PC-based DVD movie viewing since the disc format debuted in 1997. Five years later, these critics are uncharacteristically quiet.

Although desktop sales remain flat, notebook sales flourish; there are few apps for the road more entertaining than watching movies. Moreover, an increasing number of desktop PCs now come equipped with the ability to output video to televisions and monitors, sometimes simultaneously, letting even a used \$300 computer become the home's DVD player.

■ **Come Into Its Own.** PC-based DVD-Video is finally hitting its stride, but five years is still a short time when considering how long PC-DVD took to become popular. The technology still has its share of bugs and incompatibilities, not to mention that old

systems may have trouble with newer peripherals. For example, some DVD-ROM drives are external USB (Universal Serial Bus)-based devices, but Windows 95 and Windows NT don't support USB.

PC-based DVD-Video is a fabulous application, but you do need to be prepared for problems. We'll walk you through some of the bigger hitches, from the obvious to the obscure, and try to make sure nothing comes between you and a relaxing trip to the movies—on your computer.

Problem: Windows Media Player in Windows XP will play my CDs just fine, but not my DVDs.

Cause: WinXP does not natively support DVD-Video playback. The OS (operating system) lacks a built-in MPEG-2 (Moving Picture Experts Group-2) decoder.

Solution: First off, if you upgraded to WinXP from a previous Windows version, make sure you don't have a DVD decoder

installed. Click Start, click Run, and type `dvdupgrr /detect`. This will result in a little box either declaring "No decoders found" or an affirmative providing details on which previous Windows version your existing software supported for DVD playback. If an upgrade is available for your old decoder, go back to the Run prompt and type `dvdupgrr /upgrade`. The results will instruct you where to go for the appropriate software patch to enable DVD playback under WinXP.

If no such upgrade exists for your system, don't worry. Microsoft launched WinXP with DVD decoders available as third-party patches available from Cyberlink (<http://www.gocyberlink.com>), InterVideo (<http://www.intervideo.com>), and Ravisent (<http://www.ravisentdirect.com>). A fourth decoder from National Semiconductor (<http://www.mediamatics.com>) has been noted as "coming soon" for many months. The DVD patch sells for \$14.95 (or bundled with a WinXP MP3 encoder for \$19.95) and is a quick, easy-to-install download.

Problem: I'm a perfectionist when it comes to my entertainment so I purchased a top-flight audio card with Dolby Digital output for the best possible movie performance. However, I still hear a lot of background humming, pops, and other noise.

Cause: You're likely picking up RF (radio frequency) interference from at least one other electronics device, probably located close to the sound card inside the PC.

Solution: This is one case where digital audio shows a clear advantage over analog. Dolby Digital is a six-channel (5.1) sound system typically output through three analog ports: one for the front satellites, one for the rear, and one for the center and subwoofer. One of the problems with analog equipment is that it can be susceptible to interference from other system components. In particular, poorly shielded power supplies are notorious interference generators. Noise can creep in on the sound card, the audio jacks, and even the speaker cable. Because the analog waveforms moving from the sound card to the speakers are being disrupted, interference manifests itself as background (and, in bad cases, foreground) noise.

The way around this is to make use of the SPDIF (Sony/Philips Digital Interface) output port. SPDIF is also capable of 5.1 Dolby Digital output (the port is sometimes called a

Dolby Digital interface), only now the signal is carried on a single digital line rather than three analog lines. A digital signal means there are no waveforms to disrupt. Only 0s and 1s make up the audio feed. Because interference cannot insert 0s and 1s into the data stream, there is no risk of picking up stray noise. If you want the clearest possible audio, be sure to use a high quality digital speaker system using SPDIF output from the sound card. Note that external SPDIF cables are identical to composite video cables, a handy fact to know if you need to purchase one from a store that doesn't specialize in audio equipment.



PowerDVD is one of the more advanced DVD applications on the market. It excels in audio support and offers a number of handy features, such as mouse control and screen capture.

Problem: The DVD player software will not install or run properly.

Cause: A compatible version of the DirectX API (application program interface) may not be installed.

Solution: Most current DVD players require DirectX 8.1. This is the version that ships with WinXP. However, previous Windows versions, including 2000, may need to have their DirectX software updated. Microsoft makes these updates available for free at <http://microsoft.com/windows/directx>.

Another possible cause of installation or playback errors is a conflict with other DVD player software already installed on the system. To assure maximum stability, be sure to uninstall existing players before installing the new one. If your current DVD software does not include an uninstall routine, go into Windows Control Panel and double-click Add or Remove Programs. From the list of Currently installed programs, highlight your existing player(s) and click the Remove button.

Problem: Movie playback on my notebook with my external DVD-ROM drive works, but the playback is extremely choppy.

Cause: You are probably using an external drive with a USB 1.1 connection. USB 1.1 is only a 16-bit technology with very limited bandwidth for a data-heavy application, such as video.

Solution: Unfortunately, the best solution is to use a different drive with an alternative interface format, namely PC Card, IEEE (Institute of Electrical and Electronic Engineers) 1394, or USB 2.0. All three of these formats offer plenty of bandwidth for multimedia applications.

Problem: My DVD player is supposed to play audio CDs. I see the software playing the disc, but no sound comes out.

Cause: Assuming that the speakers, sound card, and sound drivers are properly configured, the cause is likely the lack of an audio cable.

Solution: To enable CD-Audio playback, all optical drives require a special audio cable connecting the drive to the sound card. Customarily, this cable connects to the CD-ROM, but as DVD drives are now supplanting CD drives, the cable is moving to a new home, even though the sound card may have a label reading something to the effect of "CD Audio." Also know that most mainstream and performance-class drives and sound cards now offer



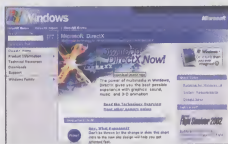
The best of all worlds, WinDVD combines a user-friendly control console with a lot of robust functionality. Inventive features, such as Time Stretching and thumbnail-based bookmark lists, are part of why this title is, according to InterVideo, the world's most popular DVD player application.

SPDIF ports alongside conventional audio jacks. The SPDIF cable connecting these two devices should be included with your sound card, but be aware that the analog and digital jacks require different cables.

Alternately, if you're lacking the correct internal audio cable, you can plug amplified speakers directly into the stereo jack found on the DVD drive's face plate. You won't get surround sound with this method, but stereo beats silence when it comes to playing most discs.

Problem: My DVD shows up in Windows with a drive letter, but the disc is inaccessible.

Cause: There could be several causes.



One of the leading reasons why DVD players fail to install is that system do not have a current version of Microsoft's DirectX installed. Microsoft makes this application available for download at no cost.

Solution: If you're using an external DVD drive, confirm that the power adapter is properly plugged in. Line power from the interface port may be enough to register the drive's presence in Windows but not enough to actually operate it. Also, if you have another interface port available, try the drive there, just in case the first port is defective.

Make sure the DVD is seated firmly on the retainer ring in the middle of the disc tray, assuming your drive has such a ring. If not, double-check that the disc is resting in the center of the tray's circular indentation. If the disc is riding up on the edge of the indentation, it won't be able to spin properly.

Of course, make sure you are using the latest drivers and firmware for your DVD drive. Older, possibly buggy drivers may get the drive recognized, but they won't necessarily guarantee proper playback.

Problem: The tray is stuck and won't open. All I hear is this clicking noise.

Cause: Either the disc is misaligned in the tray and is jamming the mechanism or the drive has failed.

Solution: Similar to CD drives before them, most DVD drives feature a tiny hole in the front faceplate. If you take a medium-sized paper clip, straighten it, and gently

push it into the hole, you'll feel it press against a pin inside the drive. This is a manual eject mechanism. If the tray is able to open at all, the paper clip trick will open the tray door far enough for you to grab it and pull the tray all the way open.

This is also handy if you should ever remove the drive from the PC, then realize that you forgot to take out the last disc you played, an extremely common oversight for those who upgrade.

From here, you can see if the disc was misaligned. If the tray refuses to open or close with power to the drive and no disc in the tray, your drive is defective and you need to replace it.

Problem: My DVD player reads some discs but not others.

Cause: If only a few discs are not being recognized, the disc media itself is probably at fault. The disc may be too dirty or scratched to be read.

Solution: Optical discs are reputed to be much less prone to the physical defects that

abrasive fabrics may scratch the media and worsen your problem, so be careful. Also, some scratches may be repairable. The object is to soften the edges of the scratch so the laser doesn't bounce off the track at odd angles. Using a damp cloth with a bit of plain white toothpaste or plastic cleaner, wipe across the scratch as if you were cleaning the disc, from center to outer edge. You won't eliminate the scratch, but you may soften the damage enough to make it usable again.

These methods are a last resort, and you use them entirely at your own risk. Rubbing a disc with abrasives may only add new scratches to the old.

Problem: My DVD drive won't read CD-R (CD-recordable) or CD-RW (CD-rewritable) discs.

Cause: Many early DVD drives are incompatible with writeable CD media. Also, some drives may only work with certain types of CD media.

Solution: A specification called Multi-Read was designed to ensure that all consumer class optical drives would be compatible with CD-R and CD-RW media. Unfortunately, several early DVD drives did

Problem: I found some good deals on DVD movies while traveling, but the discs won't play on my system.

Cause: Assuming the discs are legal authorized DVDs and not illegal copies of dubious quality (a serious problem in many areas of the world), the problem is that the discs are coded for a different global region.

Solution: The DVD RPC (Regional Playback Control) standard defines eight global zones. Zone 1, for example, covers the United States and Canada; Zone 2 encompasses Japan, Europe, South Africa, and the Middle East; and so on.

The reason for this is to keep movies released for home use out of homes in regions where the movie is still making its run in theaters. Since the start of 2000, all legal DVD drives have been coded for their region, although some models have been hacked for multiple- or all-zone compatibility. Still, if you purchase a Zone 4-coded movie in Australia, it won't play in a Zone 1 DVD drive.

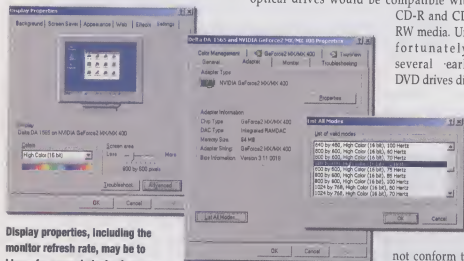
The good news is that you can change your player's zone code up to five times. This might be desirable if you move from one zone to another. The four times you change the zone setting, the drive is locked on that region permanently. For more region information, see <http://www.microsoft.com/developer/tech/hardware/dvd/dvdregion.htm>.

Problem: When I try to play a movie, Windows gives me this error message: "DVD Player Analog copy protection violation: Windows cannot play this copy-protected disc because it cannot verify that the video outputs on your DVD and/or VGA (Video Graphics Array) cards support copy protection."

Cause: Most likely, the system hardware or its drivers do not support copy protection.

Solution: Make sure you are running the most current drivers for your DVD and display adapter hardware. Occasionally, this problem is caused by leaving cables plugged into your video adapter's output jacks so make sure all external cables save for the VGA cable are removed. If neither of these solutions work, investigate the display card and DVD drive, checking to see if both are known to be compatible with your OS and DVD player software.

Problem: When I try to play a DVD movie, I get the following error



Display properties, including the monitor refresh rate, may be to blame for several playback errors. Tweaking the color, resolution, and refresh setting can clear up these problems.

plagued cassettes and vinyl), and it's true that the robust error correction in DVD technology can usually withstand scratches up to about 6 millimeters in length. However, dirt and scratches can still block or skew a DVD drive's reading laser. Nothing can be done about scratches, but dirt, dust, and fingerprint smudges can be cleaned. Ideally, you should use a soft cloth made damp with a little isopropyl alcohol and rub in a straight line from the disc's center to its outer edge.

not conform to the Multi-Read spec and therefore cannot read those formats. Unfortunately, nothing can be done about this, save swapping the drive for a compliant model.

You may also notice that your DVD works with some recordable CD media but won't work at all with others. Strangely enough, this may have to do with the color of the disc. Recordable CDs come in silver, gold, blue, and other colors, depending on the dye used in the writeable layer. Some DVD lasers may be more sensitive to certain colors. Try to keep track of which colors work best, then stick with them.

message: "DVD Player While setting up DVD-Video playback, it was found that * Video cannot be shown on the computer monitor because of one of the following reasons: a) Low video memory. Please try using lower display resolution and/or colors. b) Another application is currently using the necessary display resources. Please ensure that no such application is running. c) The display adapter is incompatible with the DVD decoder. Please try to obtain a display driver update. Do you want to continue?"

Cause: There is either a fundamental incompatibility between the system's display adapter and the DVD player software or the display adapter lacks sufficient resources to play the video.

Solution: The only option besides replacing the video card is to try to lighten its burden. This is done by lowering the screen resolution, number of colors being displayed, or both. You can change these settings by right-clicking an empty area of the Windows Desktop, selecting Properties, and clicking the Settings tab. Reduce the color and resolution settings gradually, checking at each step to see if the lower specs have solved the problem. We don't recommend going any lower than 256 colors (which will look terrible for video) and 800- x 600-pixel resolution. The alternative is to see if an affordable memory upgrade is available for your video card.

Note that this same solution applies to another common error message: "Create Overlay failed." The error instructs you to lower your screen resolution or color depth and try playing again.

You might also receive this error if Microsoft NetMeeting is running or is located on your taskbar. Both applications access the overlay mixer, resulting in a potential conflict over display resources.

Problem: Playing movies causes my DVD drive to play erratically or to lock up altogether. This can happen anytime in the duration of the movie, not just at the very beginning.

Cause: A customized refresh rate may not agree with your movie playback requirements or you're experiencing a conflict with some background application. Power management features may also be to blame.

Solution: Refresh rate controls are located in the display adapter's advanced settings area. Right-click the Desktop, select Properties, click the Settings tab, and click the Advanced button. Now click the Adapter tab. Depending on your specific video driver, you may see a pull-down menu for the refresh rate. If so, select Adapter Default from the menu. Alternately, you may only see a List All Modes button. Click this and you'll see a long list of all possible resolution, color, and refresh rate modes. Make sure you leave the resolution and color depth the same, but select a different refresh rate. The most common refresh rates are 60Hz, 70Hz, and 72Hz. Use trial and error to see which best suits your DVD playback.

If a background application is causing the problem, the usual culprit is typically a screen saver. Get to the Display Properties options by right-clicking the Desktop, selecting Properties, choosing the Screen Saver tab, and selecting None from the drop-down list. Click the Apply button.

If this fails to solve the problem, another background application may be the problem. Press CTRL-ALT-DELETE to access the Task

Manager and begin closing applications one by one until the problem disappears. In later versions of Windows, you will see a tab labeled Processes. The conflicting application may reside on this list, and you may face a long process of experimentation in



Intuitive and effective, CinePlayer provides rock-steady DVD audio and video while not overwhelming the user with a lot of "power features."

trying to isolate the culprit, if the culprit is an application conflict in the first place.

The problem may also be your power management settings, which have caused countless conflicts since the Earth-friendly features started appearing back in Win95. From the Screen Saver tab in Display Properties, click the Power button. In the Power Schemes tab, find the Power Schemes drop-down list and select Always On. Apply this setting and click OK. Power settings aimed at mobile use are particularly prone to causing errors.

■ **Put A Good Spin On It.** The list of potential DVD maladies goes on and on. A partially defective power supply or an internal power cable may be supplying the improper amount of voltage to the DVD. There could be an electrical short in the display card or motherboard. Even overlocking the CPU or graphics accelerator is known to disrupt DVD playback.

Fortunately, as DVD functionality grows in popularity, manufacturers continue to refine their hardware and software designs, resulting in increasing stability for applications, including movie watching. In most cases, movie watching should involve little more than plugging in a disc and pressing the Play button, just like on a home DVD player. However, should trouble strike, you're now prepared to tackle most any problem. Just don't forget the popcorn. [E]

by William Van Winkle



With its SPDIF (Sony/Philips Digital Interface) and optical audio ports, Creative Labs' Extigy is an excellent example of a high-end sound product ideal for using a PC to create a home theater DVD experience.

Device Problems

Keep Your Peripherals Communicating With The PC



With the proliferation of add-on devices for PCs, many computers have moved from their traditional roles as data processing products to become the central connection points for extensive, multiple-device networks. Digital cameras, DVD players, and PDAs (personal digital assistants) have become commonplace PC devices, and users are now controlling video cameras, home security systems, and even baby monitors from their PCs.

Using your PC as the management center for a group of auxiliary products is convenient but not always trouble-free. The system that

connects your PC to its peripherals is built of layers of successive technologies, each of which is supposed to be compatible with the others. This complex network resides on a conceptual framework that was conceived nearly three decades ago. Successive years have brought substantial improvements, but never has a complete overhaul of the system been accomplished. This is considered impractical, as it would require users to abandon their existing technology and investment.

Consequently, the system of buses (data pathways) upon which all of your peripherals depend is precarious and can become unstable. When it does, one or more of the devices

may cease to work, which seems to happen at the most inopportune time. Sometimes this breakdown occurs when you add a new device, the proverbial straw that breaks the camel's back. Oddly enough, however, device failure can also occur when it appears that nothing has changed.

Fortunately, there are a number of proven techniques for finding and eliminating the causes of a breakdown. We will detail the overall architecture upon which your devices reside and discuss the methods for identifying and eradicating the source of problems.

■ **A Tangled Web.** When the initial architecture of personal computers was developed more than 20 years ago, its originators could not possibly have imagined how the PC would evolve. In early PCs, data transfer and processing was rudimentary and limited, and the buses upon which information traveled were only sophisticated enough to handle simple functions. In 1982, when *Time* named the IBM PC its Person Of The Year, the product that received this accolade consisted of a CPU, a keyboard, two 5.25-inch floppy diskette drives, and a monitor and/or printer. It did not even have a mouse, which was introduced by Apple in 1983.

As rudimentary as these systems were, they contained the nucleus of the technology that still drives peripherals today. In the intervening years, computers have grown in complexity, and bus architectures have become much more capable. Today, they have evolved to the point where we can connect a dozen or more devices to our PCs with a reasonable expectation of success.

■ **Unchanged Components.** Despite all these advances, the underlying communication framework, how the PC and its devices speak to each other, has not changed significantly since its original debut. This technology, then and now, has four central components:

- The bus architecture: a network of fine wires along which information travels.
- An interrupt request system: an organizational plan that enables each device to

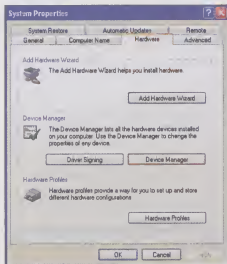
request and receive the attention of the computer as needed so that all do not attempt to speak at once.

- **An addressing system:** a scheme that assigns a portion of a PC's resources to each device to avoid overlap. These resources include IRQs (interrupt request lines), which are segments of the aforementioned interrupt system; I/O (input/output) addresses, which identify the devices to the computer; and DMA (direct memory access) channels, which are pathways that enable the device to access the computer's memory.
- **A collection of drivers:** programs that act as translators between the device, the computer, and the programs that use the device.

These devices form a communications network of sorts that lets your PC and its devices interact with one another. A good analogy for this network would be a conference call. Imagine yourself involved in an ongoing call with a group of strangers, none of whom speak your language. Each of these individuals is vying for your attention, sometimes at the same time, and each often requires a response from you.

In order to keep the call from becoming a free-for-all in which no one is heard or

understood, you assign each person an identifying name, a designated turn, and a translator who can interpret the conversation. The designers of the PC did much the same thing, creating the bus architecture (phone lines), interrupt request system (turns), addressing



Instead of having its own tab in Windows XP, the Device Manager is found in the Hardware tab.

system (names), and drivers (translators) that provide structure to the system.

With our conference call, everything works fine as long as each member of the conference follows the guidelines. The same is true for a PC and its devices. If any of the components fail to operate properly or, in the case of a resource address, if more than one device is trying to use the same resource, a device will either cease to work or function erratically. When you consider that there are more than a dozen data bus architectures in existence, half a dozen of which are present on the latest PCs, it's no surprise that the system sometimes breaks down. For more about the different bus architectures and data transfer methods, see the sidebar "Data Delivery."

■ **Improve The System.** To reduce the amount of time and effort users spent configuring their devices and resolving the inevitable problems that arose, Microsoft incorporated two powerful device-management components into Windows 95. One was PnP (Plug and Play), a feature that enabled Windows to recognize and configure devices automatically. It helped users find the most compatible driver for a device, which could include drivers already installed by other devices or drivers on the Windows installation CD. In addition, Windows checked its current

Data Delivery

Of the dozen or so types of data transfer methods developed for PCs, fewer than a half-dozen are used to connect external devices to PCs. Others, such as AGP (Accelerated Graphics Port), are used internally. The most common types, and their strengths and weaknesses, are detailed below.

Serial. One of the oldest data buses, a serial port transmits data serially, one bit at a time. The technology is slow (maximum 115 Kbps [kilobits per second]) but very inexpensive. It is used for peripherals, such as mice, that do not require much throughput.

Parallel. An improvement on serial port technology, parallel is also an older type of data bus. With a parallel port, data is sent

in 8-bit groups with the data being lined up in pairs of two. Originally, parallel ports could support data transfer rates of up to 1.2Mbps (megabits per second). A new parallel data transfer protocol, IEEE (Institute of Electrical and Electronic Engineers) 1284, has recently been introduced. It uses standard parallel ports but enables data transfer at rates as high as 24Mbps. Parallel ports were originally used mainly for printers, but the new IEEE 1284 standard is fast enough to be used for CD-ROM drives and other high-speed peripherals.

USB (Universal Serial Bus). This standard forever changed the external device market when it was released several years ago. With USB, up to 128

devices can be daisy-chained (connected sequentially) to one port connection. They all share the available bandwidth. The first USB specification, USB 1.1, supported data transfer rates of only 1.5Mbps, but a new specification, USB 2.0, boosts transfer speed to as high as 480Mbps (although 300Mbps is more common). USB devices can be hot-swapped, which means they can be unplugged and reconnected without shutting down the computer.

IEEE 1394. A super-high-speed external bus architecture that supports data transfer rates of up to 400Mbps, IEEE 1394 is very flexible. A single port can connect up to 63 devices, and it supports hot-swapping similar to USB. IEEE 1394 devices offer

isochronous (time-dependent) data transfer, which means that data is sent at a precise, constant rate. Consequently, IEEE 1394 devices are expensive to produce, and their use is limited to high-end video and other bandwidth-intensive applications.

Bluetooth. In development since 1998, Bluetooth is a wireless networking technology that connects PCs and PDAs (personal digital assistants) with printers and other devices from a distance of 30 feet or less. Its big advantage is that it is not line-of-sight and works at a greater distance than infrared wireless connections. Bluetooth operates via radio waves and has a maximum speed of 1Mbps. □

Now that you're familiar with *Device Manager*, you're in a good position to begin resolving *device failure issues*.

resource assignments and altered the settings on either the new device or existing ones to make sure everything worked.

The second new feature was the Device Manager, a utility within Windows that monitored resource allocation and device compatibility. It provided a snapshot of the system and any conflicts and helped users to pinpoint and troubleshoot problems that arose.

PnP experienced a lot of problems at first. A PC had to be PnP compatible for it to work (computers made after 1996 should be PnP compatible). In addition, many older devices were not PnP compatible. As a result of these problems, users bestowed the derogatory nickname "Plug and Pray" to the feature. Even so, both PnP and Device Manager represented big steps toward resolving device compatibility issues. Substantially improved versions of both are still present in Windows today. Together they are the key to resolving device problems.

■ **Hire A Manager.** As the device management utility for versions of Windows after Win95, Device Manager is an invaluable resource. Familiarizing yourself with it will help you understand how devices work.

To open Device Manager (in Windows 9x/Me), click the Start menu, choose Settings, and click Control Panel. Double-click the System icon and click the Device Manager tab. In WinMe, you may need to click View All Control Panel Options.

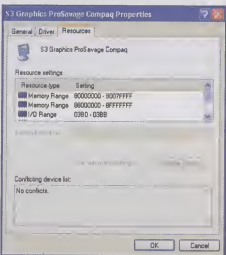
In Windows XP, choose Control Panel from the Start menu, click Performance And Maintenance, and click System. Click the Hardware tab and then the Device Manager button.

When Device Manager opens, you'll see a list of components with names such as Display Adapters and Floppy Disk Controllers. These are the various devices, both internal and external, that operate as part of your system. Components tracked by Device Manager include not only hardware elements, such as diskette drive or modems, but also software-based controllers, such as audio codecs (compression schemes), and system components, such as the internal clock. In short, Device Manager monitors any system component that interacts with the computer's processor or

memory. (NOTE: If you only see the word *Computer*, click the plus sign [+] in front of the word to expand the list.)

Click the plus sign (+) in front of each component to expand the listing. This will show you all the devices present on your system in each category. In some cases there may be more than one sub-item, while in others, there may be none. You may notice exclamation points (!) or other marks partially obscuring some items. Ignore these for now; we'll discuss them later.

Click a few of the devices and click the Properties button to view their properties.



If a device has a Resources tab, clicking that tab will reveal which resources are assigned to the device and whether the system thinks that the device is properly configured.

(WinXP users double-click the device; there is no Properties button.) Note the tab options available to you. Most devices will have a General tab, but others will have a Resource tab, a Driver Tab, a Settings or Advanced Settings tab, a Properties tab, or other specialized tab options. By clicking each of these, you can view the various drivers and settings associated with each device. When you are sufficiently comfortable with Device Manager, close the window.

■ **Stay Out Of Trouble.** Now that you're familiar with Device Manager, you're in a good position to begin resolving device failure

issues. Even though this powerful utility is a great resource, it is not the only means of solving problems. Many device issues are simple and can be resolved through a question-and-answer process without the assistance of Device Manager. We will discuss these first, then move to Device Manager and its features.

Is the device ready? Check to make sure that all connections are tight and that you have not accidentally turned a device off or unplugged it. Check to see if it has a "ready" or "online" light and, if it does, that the light is lit. This sounds simplistic, but an amazing number of device failures occur because someone's dog or little brother bumped into a device and disconnected it.

Is the device Windows compatible? Microsoft maintains a Hardware Compatibility List (<http://www.microsoft.com/hcl>) that documents all the devices it has tested for compatibility with Windows and PnP. Check to see if your device is on it. If so, proceed with the troubleshooting process. If not, contact the manufacturer to see if it has a software update or new driver that will help the device work with Windows. If not, you may have problems getting the device to work with Windows. You may be able to run it from within DOS. Check with the documentation that came with the device.

Did Windows PnP recognize the device when you first added it? (If the answer is yes, skip to "Is the device present in Windows?") If Windows recognized the device, you would have received a message when you first connected it and a wizard, an automated routine, would have walked you through the process of enabling the device. If this has not occurred, shut down your system, turn off and disconnect the device, then reconnect it, checking to make sure all the connections are tight. Restart your system and see if Windows recognizes it. If your device came with an installation CD and you did not use it during the initial installation, try using it now.

If Windows does not recognize the device the second time around, you can attempt to add the device manually. Open the Control Panel as discussed earlier and select the Add New Hardware icon (Win9x) or Add or

Remove Hardware icon (WinMe). In WinXP, select the Printers And Other Hardware category and click Add Hardware in the See Also box on the left-hand side. Double-clicking these icons will initiate the wizard. Follow the steps while Windows looks first for PnP devices, then for nonPnP devices.

If Windows does not find your hardware, use the Back button (or rerun the wizard) until you return to a screen that offers you the option of selecting your hardware from a list. (To reach this option in WinXP, choose Add A New Hardware Device from the bottom of a list of installed devices. This option appears after Windows asks if you have already connected the hardware. When you tell it Yes, Windows may perform a second search for hardware. It will then let you select your hardware from a list.)

When you click the option to select your hardware from

a list, you will be asked to choose a hardware type. Select the type that most closely matches your device and click Next. Depending on the hardware you are installing, Windows may again attempt to locate your device on the system. If you wish, you can let it search for the device or instruct it that you will select it directly from a list.

If you have a driver disk from the manufacturer of your device, click Have Disk on the resulting display. If not, select the manufacturer and model closest to yours, and Windows will attempt to install a driver and configure the device. You may be prompted to insert the Windows installation CD. After Windows has installed the device, restart your computer and see if the device works properly.

If you do not find any devices close to yours or if this process does not work, contact the manufacturer of your device for an updated driver. You may also want to visit Driver Zone (<http://www.driverzone.com>), an excellent resource for driver drivers. If you still cannot install the device, contact the manufacturer.

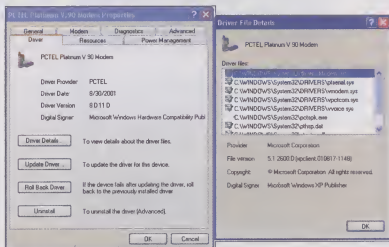
Is the device present in Windows? If PnP recognized the device originally and it is not working, open Device Manager. Your newly installed device should be present in the components list. Expand the components if necessary until you find the device.

If you do not find the device, return to the troubleshooting routines listed in the previous section and attempt to reinstall the device. This is a particularly common issue for users of WinMe/XP, which have a System Restore feature. With this feature, problems a user encounters with the system will cause it to revert to a

this device is compatible but may not have been designed specifically for it (a generic driver, for example). This may limit the functionality of the device.

A blue "i" on a white circle indicates only that the Use Automatic Settings feature is not turned on for the device. This is not indicative of trouble, but it means that Windows did not handle resource selection.

If the device is disabled (marked with a red X): Open its Properties window and enable it by changing its Device usage at the bottom of the General tab. Restart the computer. If any device is marked with a yellow circle, open its Properties window. Click the various tab options and look for a message informing you of problems with the device. In normal operating conditions, there will be a message under Device Status on the General tab that states,



By selecting the Driver tab in Device Manager, you can retrieve information about your device's drivers and initiate the driver update process.

previous state upon startup. This could make it revert to a time before you installed your device.

If you find the device, make sure it is listed only once. If the new, nonworking device is a replacement for an older device that is no longer present, check to make sure the old device is not listed. If the new device is listed twice, or if the old device is still listed, delete the unneeded device.

To delete a device, click the device in Device Manager, choose the Remove button or press the DELETE key (Win9x/Me). In WinXP, click the device and select Uninstall from the Action menu. Restart the computer to let Windows reconfigure the devices.

Does the device have a trouble indicator? Look to see if the nonworking device, or any other device in the list, displays one of the following signs of trouble:

- A red "X." This indicates a disabled device. A disabled device is physically present in the computer, but it is not available to the system (generally this means it does not have a driver loaded).
- A black exclamation point (!) on a yellow circle. This indicates a device with problems (even though the device may still be functioning).
- A green question mark (?) (WinMe only). This indicates that the driver installed for

"This device is working properly." When trouble conditions are present, there will probably be a message that mentions both a resource and another device.

An example would be: "Interrupt Request 7 used by Soundblaster Pro sound card." Make note of any listed resource conflicts (usually an IRQ or I/O range, but occasionally a DMA channel) and the device it is conflicting with. If no conflict message is present, skip to "If the device is marked with a green question mark."

You will have to eliminate any conflicts before your devices will work properly. Look for a Resources tab and, if one exists, check to see if the Resource Settings area is active, not grayed out. If there is no Resources tab or if the Resource Settings area under the tab is not active, you cannot check or alter the resource settings. Delete one or both conflicting devices and let Windows reconfigure the system. Only delete devices that are identifiable peripherals (not critical to system function), such as modems, scanners, and printers.

If you find a Resources tab with an active Resource Settings area, you may be able to manually alter the resource allocation. This is generally a safe procedure, but if you are not comfortable with making manual system changes, use the deletion routine described in the previous paragraph.

To alter the resource allocation, clear the Use Automatic Settings box. Then, click the conflicting resource and choose Change Settings. Scroll through the available resource options to find one that is not allocated and select it. Restart the computer. If after restart the device still does not work, you can repeat this process as you continue searching for a valid replacement resource.

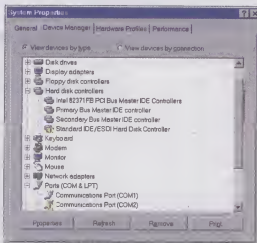
If you are unable to make adjustments because there are no available resources (this is most common with IRQ conflicts) or because the Resource settings area was unavailable to you and reinstalling the devices did not solve the problem, you have two choices. The first is to disable or remove other devices from your system to free up resources. There may be an unused port or device controller on your computer that you can disable. Check with your computer's manufacturer for further assistance. The second is to employ the Windows Hardware Profile feature. With Hardware Profiles, you establish groupings of devices that are enabled at startup. Devices that are not included in the profile are disabled. By placing conflicting devices in separate profiles, you will have access to one or the other of them, depending on the profile you choose at startup. You will not be able to use both of the devices at the same time.

To create a Hardware Profile, click the nonworking device in Device Manager and select Disable from the Action menu (WinXP) or open its Properties window and clear the Original Configuration checkbox under Device Usage on the General tab (Win9x/Me). Close the Properties window (Win9x/Me) or Device Manager (WinXP) and click the Hardware Profile tab (Hardware tab in WinXP) in the System window. Click Rename and give the profile a name that reflects the removal of the nonworking device, such as No Modem. Click the newly named profile, select Copy, and create a name for the second profile.

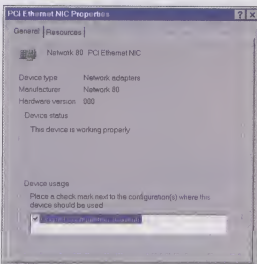
Restart the computer, selecting the new, second profile, and disable the other conflicting device in the same fashion. If you are unsure which device is conflicting with your nonworking device, refer to "Manual Maneuvers" below. Enable the nonworking device by selecting Enable from the Action menu (WinXP) or opening its Properties window and check the box associated with the second profile under Device usage on the General tab (Win9x/Me). Restart the computer and select

the second profile. The problematic device will now work (assuming there are no other issues affecting its operation).

If the device is marked with a green question mark (?): If a WinMe device is marked with a green question mark (?), or if any device



In the Device Manager, an exclamation point (!) inside a yellow circle indicates a device problem or conflict.



If you know something is wrong but you can't put your finger on it, look at the General tab of the Device Manager to see if something is wrong with a device.

is marked with an exclamation point (!) but has no resource conflicts, you may need to update the driver. To update a device's driver, open the Properties window, click the Driver tab, select Update Driver, and follow the prompts from the Hardware Update wizard.

If making the changes recommended here and restarting your computer do not solve the problem or if you have been unable to locate any of the problems listed here, you may have to do manual troubleshooting.

Manual Maneuvers. Some devices, especially sound cards, can cause conflicts that are not reflected in the Device Manager. If you have made any alterations to your system since adding the device with which you are having problems, the alteration is probably the culprit. If possible, disable or uninstall any new devices or software added since the problematic device was installed and see if it solves the problem. If nothing has been modified, then remove or disconnect all peripheral devices except the problematic one and restart your computer to see if the device works.

If it does, gradually add devices, one by one, until your device stops working. The last device you added is the one causing the conflict. Check Device Manager to see if the devices have conflicting but unmarked resources. Correct them if they do. Update both drivers. If this does not solve the problem, contact the manufacturer of one or both devices for assistance.

If the device does not work after you disconnect other peripherals, it is possible that the device is faulty. Attempt to install it on another computer and see if it works. If it does, the conflict is with an internal component, possibly even your computer's main circuit board, the motherboard. Check with the manufacturers of both the device and your computer for further assistance.

Come To An Understanding. With each successive version of Windows, device conflicts are becoming less common and easier to resolve. This applies only to those users who have up-to-date hardware and software, however. Old devices often don't work well with new versions of Windows, at least not without updated drivers. In addition, conflicts can arise when new software is installed, when Windows is updated, and when other devices are added.

Not all of these changes will cause a device failure right away, but they will usually cause a flag to go up in Device Manager. By checking Device Manager for conflicts every time you alter your system and using the Hardware Update Wizard to keep your drivers up to date, you should be able to nip potential problems before they bring your system and its devices to a crashing halt. **15**

by Jennifer Farwell

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Changing Drive Formats

The Point Of No Return

As PC OSes (operating systems) have evolved, so have the file systems the PCs use to manage stored information.

Each file system supports one or more formats, or schemes, to store data, file names, security characteristics, and other information on the magnetic surface of the hard drive. If you upgrade to a newer version of Windows, you may be asked to specify which format you wish to use: NTFS (NT File System), FAT (file allocation table), or FAT32 (32-bit FAT).

What are the differences between the used formats and which should you select? Can you convert to a different format at a later time if you decide not to do so during the OS installation or upgrade? Once you convert, is there any way to revert back to your original format if you find that some of your older applications no longer operate correctly? We will attempt to answer these and other questions relating to file systems and formats.

■ **Microsoft File Systems.** The various PC file systems reflect the characteristics of the hard drives available at the time each system was developed. When the IBM PC was first introduced in 1981, the largest hard drive available was 10MB, and most PCs used 5.25-inch floppy diskettes as their primary mass storage medium. Disk formats had to be very efficient and file systems were simple.

MS-DOS, also introduced in 1981, manages files using FAT. The primary purpose of the FAT is to store the physical disk locations of file segments, known as **clusters**. The size of the FAT entry determines the magnitude of the number it can contain. This, in turn, determines the maximum number of clusters a partition may contain. A **partition** is a reserved portion of a disk that functions as a separate unit and contains its own file system. A disk may include one or more partitions and each partition is assigned a unique drive letter. Microsoft OSes always designate the bootable partition as C.

Early versions of MS-DOS used a 12-bit FAT entry that limited the maximum partition size to 16MB. Beginning with MS-DOS 3.0, Microsoft

increased the FAT entry size to 16 bits, which increased the max partition size to 4GB. Today, FAT16 is known simply as FAT, and it is the only file system supported by every Microsoft OS from MS-DOS through Windows XP.

When Microsoft released Windows 95, it also introduced a new file system, VFAT, to provide support for long file names. This was soon replaced by FAT32, which added support for partition sizes of up to 2TB (terabytes; more



than 2,000GB). FAT32 is the default format of all new installations of Windows 98/Me and is available as an upgrade for older FAT volumes.

In addition to increased hard drive capacity, FAT32 uses this space more efficiently, resulting in a 10% to 15% decrease in file size. This occurs because on small disk drives, FAT32 uses a smaller cluster size than FAT16, resulting in less wasted space when a cluster is not completely filled. FAT32 supports a maximum file size of 4GB, compared to the 2GB limit of FAT.

In the early 1990s, Microsoft released Windows NT, its first OS created specifically for the

corporate environment. To make WinNT competitive with Unix and other business-class OSes, Microsoft designed NTFS, which provides better reliability, security, and access control and includes support for larger partition sizes. In addition, the size of a single file is limited only by the size of the partition it resides in.

■ **Which To Use.** Not all of these file systems are supported by each OS so your choices may be limited by the version of Windows you are using. In general, if your OS supports it, you should choose NTFS because NTFS provides capabilities not found in FAT32 and FAT, and some of the advanced features of Windows 2000 and WinXP actually require NTFS.

There are some situations where choosing the most recent, robust OS is not a good strategy. For example, if you plan to upgrade from Win98 to WinXP and you want to retain the option of reverting back to Win98 at a later date, *do not* convert your FAT32 file system to NTFS. According to Microsoft, "Once you convert a drive or partition to NTFS, you cannot simply convert it back to FAT or FAT32. You will need to reformat the drive or partition, which will erase all data, including programs and personal data, on the partition."

There is another situation where you might want to choose an alternate file system. It is possible to install more than one OS on your computer and select which one to use each time you start your computer. WinXP, for example, can coexist on computers with any previous Microsoft OS and with some non-Microsoft OSes, such as Linux. This configuration, known as **dual boot**, is useful if you have older applications that are not compatible with newer versions of Windows or if you want to test an application with two or more OSes.

Set up dual boot. When you set up a dual-boot configuration, each unique OS must be installed into a separate partition. If your hard drive is already formatted with a single partition, you may have to repartition and reformat the hard drive. This will result in the loss of all existing data on the drive.

If your hard drive already contains applications and data, you should consider using a third-party program, such as PartitionMagic from PowerQuest (<http://www.powerquest.com/partitionmagic>) or Partition Manager (<http://www.partition-manager.com>) from Paragon Software. These utilities can be used to "chop off" an unused portion of a partition and convert this space into a new partition. They can

also convert NTFS partitions back to FAT or FAT32, something no Microsoft utility will do.

Fdisk. If you do not have access to third-party programs, or if your hard drive does not contain any valuable data, you can use Microsoft's `fdisk.exe` program to set up your dual-boot configuration.

On Win98/Me systems, this program can be found in the `C:\WINDOWS\COMMAND` folder. `Fdisk.exe` must be run from the command prompt, and if you plan to modify your boot drive, you must create a bootable floppy diskette and copy `fdisk.exe` to it. This is necessary because once you delete the existing partition on the hard drive, you will no longer be able to boot from it.

To create a bootable floppy diskette, insert a blank diskette in the floppy drive, double-click My Computer, right-click the floppy drive (usually A:), and click Format. When the Format window opens, be sure to select Copy System Files. After the format process has completed, copy `fdisk.exe` to the floppy diskette and reboot your computer from the floppy diskette. After the computer has booted, type `fdisk.exe` at the command prompt.

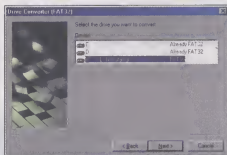
`Fdisk.exe` gives options for creating, displaying, and deleting partitions and logical drives. Deleting a partition destroys all the data on it

File System Support

Microsoft's OSes (operating systems) support various combinations of the three commonly used file systems, but only Windows 2000 and Windows XP support all three types.

	FAT	FAT32	NTFS
MS-DOS	X		
Win3.x	X		
Win95(a)	X		
Win95(b/c)	X	X	
Win98/SE	X	X	
WinNT	X		X
Win2000	X	X	X
WinXP	X	X	X

and a new partition must be formatted before it can be used. Repartitioning also forces you to reinstall the original OS as well as any applications, system settings, and user preferences, including Control Panel settings. When you reinstall your OSes, you may have to use your original bootable media, such as the Windows 98 Boot Disk, in order to gain access to your CD-



The Windows 98 Drive Converter utility can be accessed through this graphical interface or from the command prompt. The Windows XP version is only available from the command prompt.

ROM drive. If your PC supports booting from the CD-ROM drive, this will not be necessary.

Amicable split. Each partition on your hard drive may be formatted with a different file system, but if you plan to access the files in one partition while using the OS from another, the partitions must have compatible file systems. So if you created a dual-boot system with Win98/FAT32 in one partition and WinXP/NTFS in another partition, WinXP would be able to read and write files in the FAT32 partition, but Win98 would have no access to the files in the NTFS partition because it does not understand NTFS formatting. You could avoid this problem by creating both partitions as

- FAT32, a format understood by both OSes.

When creating a WinXP dual-boot configuration, it is always best to install the OSes in the following order: MS-DOS, Win95 or Win98 (these two can't coexist), and then WinXP. In this case, the boot partition must be formatted as FAT, not NTFS, because the earlier OSes must be installed on the boot partition and they do not support NTFS file systems. Installing the OSes in the above order will ensure that the boot partition will be correctly formatted.

Future Conversion. If you elected to retain your original file system during an OS upgrade, you can usually convert the file system later, once you are confident your applications are functioning correctly. Conversion may not be possible, however, if your partition is at or near capacity because the conversion utilities need a certain amount of free disk space as temporary storage.

The Win98/98SE/Me OSes include a utility called Drive Converter that is designed to convert partitions from the FAT16 system to FAT32. Microsoft's instructions for using Drive Converter include the standard warning that the only way to "unconvert" is to reformat the partition and that this utility will not work on hard drives that have bad sectors. Prior to converting the partition, you must remove any utilities or tools that protect or encrypt either the MBR (Master Boot Record) or the partition table. As discussed earlier, there are third-party utilities available that do not have these restrictions.

Drive Converter may be run as a Windows application or from the command prompt. To use the graphical interface, click the Start button, point to Programs, point to Accessories, point to System Tools, click Driver Converter (FAT32),

and then click Next. Select the drive you wish to convert to FAT32, click Next, and then OK. Click Next three more times and, when the conversion is complete, click Finish.

To run Drive Converter from the command prompt, click the Start button, point to Programs, point to Accessories, and click MS-DOS Prompt. In the window, type `cvt <drive> /cvt32` and press ENTER. In this command, `<drive>` represents the drive letter you wish to convert.

WinXP also includes a conversion utility, but it's only available in the command

prompt version. To convert an existing FAT16 or FAT32 drive to partition to NTFS, open the command window, type `convert X: /fs:ntfs`, and press ENTER. Replace X: with the letter of the drive you wish to convert.

A One Way Street. There are many good reasons for converting your hard drives to the most robust file system supported by your OS, including increased reliability, performance, and security, but it is important to remember that there is no easy way back. Prior to converting a partition, always make a backup to protect your personal data. Also, keep in mind that if you are forced to reformat a partition, you will have to reinstall any Windows applications it contained so make sure you have the original install diskettes and key codes available before attempting the conversion. [E]

by Dick Archer



To determine which file system is installed on a Windows 98/Me/XP drive, double-click My Computer, right-click the drive icon, and click Properties.

Kicked Off The Bus

How To Solve USB-Related Problems

Computers are more useful and flexible than ever before because there are so many different kinds of peripherals to plug into them. Printers, scanners, digital cameras, CD burners, PDAs (personal digital assistants), modems: The list seems endless. How PCs use these devices has been simplified greatly because of a relatively new technology: USB (Universal Serial Bus).

You probably have a couple of USB-enabled devices plugged into your computer right now. But how does USB work? Why is it so much better than legacy technologies, such as serial and parallel? And if a problem appears with a USB device, what can we do to diagnose and fix it?

■ **USB 411.** USB is serial technology, which transmits data from one device to another one bit at a time. This is opposed to the other common standard, parallel, in which data is transmitted several bits at a time over multiple-wire cables. Unfortunately, these complex cables also carry a built-in problem: signal degradation. With all of the wires bundled together, the energy contained in the signal piping through one wire can interfere with the signal on another wire, damaging the data as it travels. Serial connections, on the other hand, suffer from neither high cost nor interference problems.

Until just a few years ago, serial connections were low-speed and relatively hard to configure. USB is much faster than older serial connections or even most parallel connections. Instead of trying to pump several bits through a thick cable a few thousand times per second, today's USB standard, version 1.1, shoots individual bits through a wire at a rate of 12Mbps (megabits per second). USB bypasses all the disadvantages of clunky parallel systems and still provides great performance.

USB sports several other benefits, not least of which is being hot-swappable, meaning devices can be plugged and unplugged without having to shut down the computer. Another benefit is that whereas old serial and parallel peripherals needed their own power supplies, USB devices can pull power directly from the USB hub or motherboard, thus cutting down on cable clutter and making them more portable.

Most PC motherboards feature a single USB controller built into the motherboard's chipset or integrated as a separate on-board chip. Each USB 1.1 controller offers 12Mbps of bandwidth plus a low-speed 1.5Mbps subchannel for devices that demand fewer resources, such as mice and keyboards. USB can support a theoretical maximum of 127 devices. Many motherboards offer two built-in USB ports, but this number is gradually increasing as more and more USB peripherals permeate the market.

USB 1.1 seems ideal for almost every application, but it does have limitations. Although its speed is adequate for most peripherals, 1.1 is still too slow for data-intensive applications, such as CD burning at more than 4X speed. USB cable length is limited to roughly 15 feet. In addition, using several devices simultaneously quickly eats up USB 1.1 available bandwidth. Once the bandwidth is gone, problems set in.

■ **USB 2.0: The New Boss.** USB 2.0 was introduced in April 2000 to address several of USB 1.1's shortcomings. First and foremost, the format's bandwidth skyrocketed to 480Mbps. This is faster than most hard drive and network connections. Devices with this new technology sport a "Hi-Speed USB" logo. More than 40 times faster than its predecessor, USB 2.0 is in faster and less expensive scanners, video cameras, optical drives, hard drives, and even direct peer-to-peer network connections. USB 2.0 makes it practical to connect several USB peripherals to the computer at once without the worry that one device will rob the others of necessary bandwidth.

For now, you will need to install a PCI (Peripheral Component Interconnect)-based upgrade card or find a motherboard with integrated USB 2.0 if you want USB 2.0 capabilities.

With its new capabilities, USB 2.0 is slated to compete with another popular high-speed standard, IEEE (Institute of Electrical and Electronic Engineers) 1394 (which Apple dubbed FireWire). IEEE 1394 boasts a maximum bandwidth of 400Mbps, although speed protocols in excess of 1Gbps (gigabits per second) have been proposed.

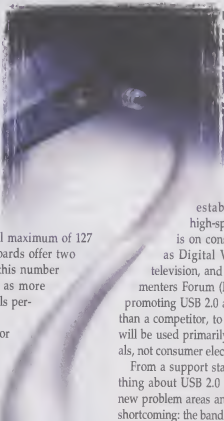
IEEE 1394 is an established player in the high-speed arena, but its focus is on consumer electronics, such as Digital Video cameras, digital television, and DVDs. The USB Implementers Forum (<http://www.usb.org>) is promoting USB 2.0 as a complement, rather than a competitor, to IEEE 1394 because USB will be used primarily in computer peripherals, not consumer electronics.

From a support standpoint, the reassuring thing about USB 2.0 is that it introduces no new problem areas and alleviates 1.1's largest shortcoming: the bandwidth bottleneck.

■ **Pave A Smooth USB Experience.** As with all new technologies, USB is still undergoing some growing pains. Hardware and software issues can make your otherwise idyllic USB setup a trial on your patience and pocketbook. Here are a few steps you can take to minimize hang-ups when installing a USB device.

Keep current. First, make sure your system is fully compliant with current USB standards. If you have a motherboard that includes USB ports, make sure its BIOS (Basic Input/Output System) is up to date to eliminate potential incompatibilities between it and the OS (operating system). If you're not sure how to update your BIOS, consult your users manual or the manufacturer's Web site for instructions.

Older OSes, such as Windows 95 and NT, do not support USB devices. Windows 95 Version 2.1 had limited USB capabilities, but Windows 98 was the first Microsoft OS to integrate full USB support. Win98 Second Edition, Me, 2000, and XP are fully compatible with current USB 1.1 specifications. Even so, be sure to check



Microsoft's Web site (<http://windowsupdate.microsoft.com>) periodically for updates in case USB-related bugs have been found and fixed. As of this writing, only Win2000 and WinXP have official support for USB 2.0, available with an update from Microsoft. Users of other OSes must depend on the device manufacturers for USB 2.0 drivers.

USB devices are PnP (Plug-and-Play) compliant, which means you should be able to just plug them in and run. However, some manufacturers require you to install the device's software before you plug in the device, and some devices need to be plugged in for the first time while Windows is running, not while the computer is off. See the manufacturer's instructions for details.

■ What Could Go Wrong? Usually, when a USB device fails or isn't correctly set up, it forces the entire computer to freeze (requiring you to power down) or causes other USB devices on the same chain to fail, as well. If you're not sure which USB component is causing the problem, try unplugging the peripherals one at a time. When everything starts working correctly, the last device you unplugged is available. Everything may not start working, though, and this often indicates that the problem is with your USB controller located on your motherboard or PCI adapter.

Before you take your apparentlyailing component back to the store, though, be aware that some other issue might be at the root of the problem. The following are several of the more common things to check in order to isolate your problem.

Device Manager. The Device Manager (located in WinXP under Start, Control Panel, Performance And Maintenance, System, Hardware tab, and Device Manager button; in Win98, click Start, Settings, Control Panel, System, and Device Manager tab) is a list of all the devices and controllers currently connected to your computer. The Device Manager will sometimes flag problematic hardware.

Once you have the Device Manager open, look through the categories for any devices with a yellow exclamation point (!) or a red "X." This indicates a problem has been detected or the device is disabled. An exclamation point (!) next to a USB Universal Host Controller, for example, generally indicates the lack of an appropriate driver or buggy driver. To enable a

disabled device, double-click the component in Device Manager, look near the bottom of the General tab, and use the Device usage dropdown list to select Use This Device (Enable).

Bandwidth. While you're in Device Manager, check the available resources of your USB system. Click the plus sign (+) next to the



Adding functionality for USB (Universal Serial Bus) 2.0 to your PC is a snap when you have a stable, well-supported add-on card, such as Adaptec's 5100. It features one internal and five external USB ports.

listing for Universal Serial Bus Controllers. Double-click the Universal Host Controller and click the Advanced tab to check the available resources of your USB setup. The more devices you plug into your USB system, the more bandwidth is used. Be careful when

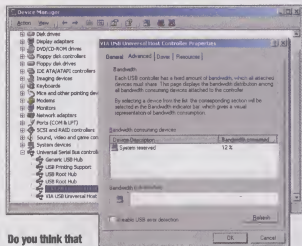
only with 20-gauge cable. The smaller the gauge (noted by higher numbers), the shorter the functional distance. Twenty-eight-gauge cable is only rated to 0.81 meters. Beyond this distance, data degradation sets in. Unbeknownst to many, there are two speeds of USB cable, high-speed and low-speed, with the primary difference between the two being their shielding. Higher-speed USB peripherals will be prone to errors caused by interference if used with low-speed cables.

Processor speed. USB devices take processor time from your computer. When using USB peripherals, slow computers might experience hiccups (short pauses in operation) while the USB device is running. This can be particularly noticeable with audio applications, which might stutter or pause during playback. Unfortunately, not much can be done to solve this issue short of removing some USB devices to free up resources or upgrading your processor to a higher speed.

Power. Many devices depend on the USB port for power, and it's important to make sure they aren't demanding more than is available. To check current power usage, double-click the USB Root Hub in Device Manager and click the Power tab. Each port can provide up to 500mA (milliamps). If you need to use several power-hungry devices and all of your USB ports are full, you will need to purchase another USB controller or install a powered hub.

Many USB devices have power-saving features that will shut down the device after a period of inactivity, causing the device to stop working until you reboot. The device is supposed to wake up when you attempt to use it, but this may not work as planned. To test this, switch off the power management feature. In WinXP's Device Manager, double-click the USB peripheral in question to bring up its Properties window. Select the Power Management tab and uncheck the Allow The Computer To Turn Off This Device To Save Power option. The device may also have an option in its own driver software to accomplish the same thing.

Drivers and firmware. Sometimes a device is rushed to market before all of its bugs have been worked out. Fortunately, most manufacturers continue to support their devices and work to fix problems as they are discovered. In most cases, by the time you experience an



Do you think that your peripherals are swamping your USB (Universal Serial Bus) channel's bandwidth? Dig into your Device Manager properties and find out.

connecting several high-demand devices to the computer at once. You might consider adding a second USB controller (via a PCI add-on card) if you find your USB channel getting cramped for bandwidth.

Cabling. USB cables are only rated to work properly at distances up to 5 meters, and this is

error, it has already been discovered and remedied by way of a downloadable update file. If you are having trouble getting a device to work correctly, try downloading the latest drivers for that device from the manufacturer's support site. If you're not sure where to find the correct drivers, try a search at DriverGuide (<http://www.driverguide.com>).

Similar bug issues may occur with a device's firmware. Firmware is internal software that tells the device and computer how to interact. If a device is non-functional, acting erratic, or causing other USB devices to disappear from the Device Manager, a firmware update might solve the problem. Check the users manual and Web site for instructions and to download the latest firmware for your device. Updating firmware is usually a simple process wherein the user downloads and runs the update file, which installs the new firmware automatically.

Incompatible hardware. Some products simply don't work well with USB, despite (often lackluster) attempts by the manufacturer to issue software patches. For instance, when PCI USB cards first came out, there were two rival chipsets, but Intel's was the only one that was operationally solid. We evaluated one competing product that never was able to function properly in our test systems because the integrated chipset was never adequately supported. Another example is the incompatibility between AMD's 756

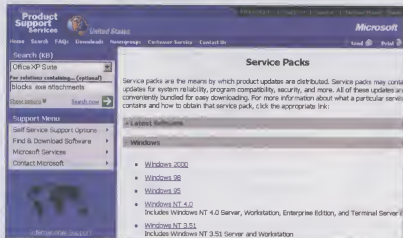
chipset and WinXP. You can prevent falling into such problems by double-checking hardware compatibility lists, particularly Microsoft's at <http://www.microsoft.com/hd>.

OS. Particularly now, during the transition from Windows 1.1 to 2.0, the issue of OS compatibility is critical. You should take care to install the latest service packs for your Windows OS by visiting the Windows Update site and

To fix the problem, obtain the most current USB driver for your motherboard or controller card and go into Device Manager and remove the USB Host Controller. Click Refresh. Windows will re-detect the controller, whereupon you can direct it to the new driver file.

Problem: I've replaced my USB peripheral, but it still doesn't work. However, all of my other USB devices work just fine.

Solution: The more ambiguous the problem, the harder it is to troubleshoot. If the device is listed on Microsoft's Hardware Compatibility List and your system is in all other ways USB compliant, we have to assume the problem is somewhere between the device and the USB controller. If other USB devices work in the USB port and with your USB cable, we can probably eliminate those two variables. Try the device on another PC. If it works, the problem is likely a driver conflict on the first system.



Even functional USB devices can perform better and be more stable if you take care to keep your drivers, firmware, and OS (operating system) up to date with the latest service releases. Keeping current with Windows Service Packs is particularly important.

perhaps even signing up for Microsoft's critical update notification. Also, if our suggestions here don't remedy your USB problems, several USB-related issues are on Microsoft's extensive Knowledge Base support site.

■ Top USB Glitches & How To Fix Them.

It's just one little cable. How much could possibly go wrong? More than you think. Here's a list of the more common USB-related errors.

Problem: None of the USB devices I install work, and Device Manager won't recognize them.

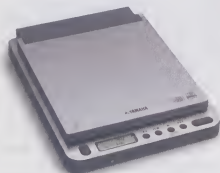
Solution: Chances are the USB Root Hub is improperly installed, quite possibly because Windows doesn't recognize your USB controller hardware. If this is the case, Windows will use a generic host driver called Standard Universal PCI to USB Host Controller. This driver is sufficient to operate your USB peripherals provided that the devices are UHCI (Universal Host Controller Interface) or OHCI (Open Host Controller Interface) compliant. Not all USB devices meet these specifications, which can also explain situations in which only some of the device's functions work.

Problem: I tried the device on my friend's system, and it didn't work on his, either. But according to the manufacturer, it should work.

Solution: Most often, such "inexplicable" device failures hinge on power and bandwidth issues. Some peripherals simply won't work when plugged into a hub, even a powered one. Make sure to power the device with an AC adapter to make sure it has enough power, then plug it directly into the PC's USB port. This approach fixes an amazing number of USB troubles.

■ **If At First You Don't Succeed.** As technologies go, USB is actually quite reliable and extremely easy to use. If a problem does appear, rest assured that the fix is probably fairly straightforward. Fortunately, several avenues of support are available on the Internet (manufacturer Web sites, Microsoft's support site, Usenet forums, and so on). With the advent of USB 2.0 and continued improvements in software and hardware compatibility, your future with USB can only get better. [E]

by William Van Winkle



If you've ever twiddled your thumbs waiting for an external USB 1.1 CD burner to perform its duties, by stepping up to a USB 2.0 device, such as Yamaha's stylish CRW70 Spyder. This sleek drive writes at 12X speeds and can rip audio at 24X.

Fight Flicker

What To Do When Your Monitor Acts Up



eyestrain, fatigue, or a migraine, symptoms you may experience without even realizing the cause. This is called **subliminal flicker**, which involves a flicker that is just below the threshold of human detection but is just as effective at causing eye fatigue.

In most cases, the root of the trouble lies with the refresh rate, the number of times per second the image on your screen is redrawn by your monitor's CRT (cathode-ray tube; three electron guns at the back of the monitor that shoot red, green, and blue rays to the front to paint

the displayed image). The refresh rate can start as low as 60Hz and, on some monitors, reach 120Hz and higher, though the highest setting is not always the best.

In fact, the ideal refresh rate setting often falls right in the middle. Set your rate too low, and you get the bothersome flicker caused by an imperceptible delay between each screen redraw. Go too high, and you may experience fuzzy image display, a strobe light effect, and possibly damage to your hardware.

Fortunately, adjusting your refresh rate is an easy change, made right inside your Desktop Control Panel. Before making any changes on your own however, we suggest you consult your user's manual, which often provides both maximum and recommended settings for all resolutions available.

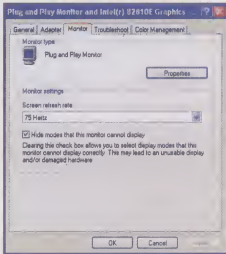
Drive 75. If your user's manual disappeared months ago, you'll likely be content with a refresh rate set at 75Hz, according to Raymond Soneira, developer of DisplayMate, the industry's standard software for display testing and picture quality software. "Many people are tempted to set their refresh rates as high as possible," says Soneira, "however, the average user, or 95% of the adult population, won't see a flicker at 75Hz."

Soneira explains that setting the refresh rate too high will overtax the system by

requiring it to redraw the screen too many times per second. Combine that with a high resolution and you get a degraded, fuzzy image. "We are limited by current technology, and the electronics inside can only handle so much," says Soneira.

To change your refresh rate, go to the Display Properties window by right-clicking your Desktop and selecting Properties and select the Settings tab. For Windows XP, click the Advanced button, select the Monitor tab, and use the drop-down list to select the appropriate refresh rate. In Windows NT and 2000, find the Refresh Frequency box. If your setting is below 75Hz, use the drop-down list to adjust accordingly. In Windows 98/Me, click the Advanced button, click the Adapter tab, and select the appropriate refresh rate for your monitor from the drop-down list. Click OK to save the new setting and close the window.

Adjust yourself. If a flicker persists, Soneira suggests you check and alter your surroundings. "The closer you sit to the monitor contributes to flicker, as does ambient lighting," says Soneira. "If possible, [lower or replace] fluorescent lighting." Soneira does acknowledge that some people are more affected by flicker than others, including those viewing larger monitors. "Females and young people can be more sensitive as well," he says. "If you think you fall into the more sensitive category, bump the setting up to 85Hz."



Save yourself from a flickering monitor and the occasional headache by adjusting your refresh rate, which is found in the Display Properties panel of all OSes (operating systems). To get to the Refresh rate in Windows XP, select the Settings tab, click the Advanced button, and click the Monitor tab in the resulting dialog box.

Your trusty monitor: always ready to start up and display your work (or play) brilliantly at your command. Even though you gaze at it nearly every day, you hardly take the time to acknowledge your monitor's presence or the tasks it performs, from displaying a static Word document with clarity and precision to its fine handling of the bright colors in those animated electronic greetings you savor. That is, of course, until one day when something goes horribly wrong and the view from your desktop isn't quite so sweet.

In fact, in some cases, it's downright painful. When that happens, you may just learn to appreciate what you had because once your monitor is gone, your beloved, high-powered PC, accessories, and gadgets are pretty much rendered useless.

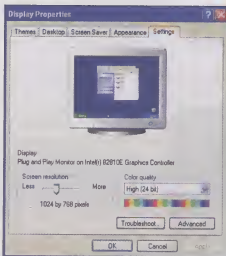
Monitor mishaps can be perplexing, if not downright infuriating—especially when you've checked the cables to find them secure and confirmed that power is up and running. Although all hope may seem lost, don't pack it up for the shop just yet. Instead, you might be surprised to find the quick fix right inside the Control Panel of your Windows OS (operating system) or your OSD (on-screen display).

Defy The Flicker. A flickering screen is not only annoying, it has been known to cause

■ **Crystal Clear.** Once you've set your refresh rate to a healthy 75Hz (or somewhat higher), you may find it feasible to adjust your monitor's resolution to achieve a more detailed reproduction of images and text. **Resolution** refers to the number of pixels displayed on your monitor and is expressed by the amount displayed horizontally by vertically, for example 800 x 600, 1,024 x 768, or 1,280 x 1,024. The general rule of thumb here is more pixels equal greater detail.

However, if you're using an LCD (liquid-crystal display) screen (or any other non-CRT), Soneira urges that you keep the resolution at the default setting or the factory setting specified in the users manual. LCD monitors use digital pixels, which deliver fixed images and are incapable of remapping an image from one resolution to another without degradation of information and quality. Change the resolution on your LCD and you'll quickly notice significantly blurred text and distorted graphics and images, explains Soneira.

CRT leeway. CRT users have a bit more room to play, as this type of monitor is capable of supporting any resolution, though size does matter when making the final decision. A resolution of 800 x 600 may appear sharp and clear on a 15-inch monitor, but on a 21-inch monitor, that same number of pixels is spread over a



Adjust the resolution to enjoy sharper images and text, but don't go too high, especially if you want a high refresh rate. The two combined can lead to fuzzy, blurry images.

screen size, or refer to the chart "Keep Your Resolutions" for a general guideline. To set the resolution, go to the Display Properties window, select the Settings tab, and drag the slider left or right to view available resolution settings. Click Apply to preview the new configuration. The monitor's screen will black out as it reconfigures your Desktop, and a dialog box

colors, or even the occasional spot or blotch on your screen.

Magnetic buildup can happen in nearly any setting though it's most frequently a problem if your computer is near anything that produces a magnetic field, such as a steel desk, unshielded speakers, or a fan. Something as obvious as running a vacuum cleaner near a PC or as unexpected as the Earth's magnetic shield can adversely affect monitor performance, according to Soneira. Fortunately, most monitors provide a degauss feature inside the OSD that will erase the monitor's memory of the magnetic buildup.

If you shut your PC down on a daily basis, you'll access an auto-degauss feature, which should eliminate any magnetic buildup with every restart. However, because most people leave their machines running for extended periods of time, Soneira suggests getting into the habit of degaussing regularly using either the OSD degauss feature (which is not available on all machines) or by periodically powering down the monitor.

"Using the OSD feature, you can degauss every 20 minutes. And, if it's been awhile since your last startup or degauss, it may be necessary to access the feature four or five times to remove the buildup. It's best to avoid [magnetic buildup] by simply degaussing often," says Soneira.

For those especially concerned with improving monitor performance, Soneira provides a sampling of test patterns at his Web site that will assist you in analyzing and correcting brightness, contrast, resolution, aspect ratio, and more. The demo screens are available at <http://www.displaymate.com/demos.html>. Scroll down to select and download Display-Mate For Windows Demo, Version 1.23.

Keep Your Resolutions

Though personal preference is the ultimate determining factor in choosing resolution, many experts agree that these settings will produce the corresponding results on image display. Find your monitor size and consult the chart for guidance in choosing your setting.

	640 x 480	800 x 600	1,024 x 768	1,280 x 1,024	1,600 x 1,200
14"	Ideal	Acceptable	Too Small	Much Too Small	Much Too Small
15"	Acceptable	Ideal	Acceptable	Much Too Small	Much Too Small
17"	Too Large	Acceptable	Ideal	Acceptable	Too Small
19"	Much Too Large	Too Large	Acceptable	Ideal	Acceptable
21"	Much Too Large	Too Large	Acceptable	Acceptable	Ideal

larger number of inches, bringing personal preference into the equation as well: Do you wish to view the larger icons, images, and windows of a lower resolution, which will essentially stretch the images and reduce the real estate on your screen? Or do you prefer the smaller images of a higher resolution, which opens up room on your Desktop and provides a more detailed picture, overall?

Consult your users manual for guidance in choosing the optimal resolution for your

will prompt you to approve the new setting before making the change permanent. If satisfied with the resolution, click OK.

■ **A Word About Degauss.** Another problem you may encounter is a buildup of magnetic energy, which affects the performance of your monitor by presenting the aforementioned strobe light effect, as well as a variety of other troubling issues, such as rainbow patterns, image distortion, washed-out

■ **Outlook Good From Here.** Although in the end it may not pay to give that monitor a well-earned pat on the backside, it certainly can't hurt. But when trouble does arise, go straight for the Control Panel or your OSD and get the relationship between you and your monitor back in gear. [E]

by Linda Rains

Less Than CinemaScope

Avoid Feeling Trapped In A Letterbox When Using Multiple Monitors



If you have upgraded from a 15-inch monitor to a 17-inch or 19-inch monitor, you know how much that extra real estate improves your computer's display. Now, imagine doubling or even tripling the size of your monitor. With the Multiple Monitors feature in Windows, you can easily expand your computer's Desktop across more than one display.

Support for Multiple Monitors is available in Windows 98/2000/Me/XP. Setting up Multiple Monitors and finding compatible video cards differs for each of these OSes (operating systems) and is beyond the scope of this article. Consequently, our focus is on using Multiple Monitors in WinXP. If you're running an OS other than WinXP, you'll find that the same concepts apply, although implementation may differ.

■ How It Works. With WinXP, you can enable up to 10 additional monitors on your desktop PC. By incorporating multiple video cards or a single video card that contains multiple ports, you can connect additional monitors to your computer. If your notebook PC has a video card with an additional port for an external monitor, you can use WinXP's Dualview feature to enable two displays on your notebook.

When you connect additional monitors to your system, the monitors work together as though they are one. You can move your mouse between the monitors, stretch a single window across multiple monitors, and drag open windows to different monitors. Multiple monitors make your Desktop much larger, giving you more room for manipulating and viewing information.

Some handy uses of Multiple Monitors include:

- Stretching the contents of a large spreadsheet over two monitors.
- Checking the results of Web page changes by working in your HTML (Hypertext Markup Language) editing software on one monitor and refreshing the page in your Web browser on another.
- Simplifying cutting and pasting between two documents by moving the window that contains one document to a different monitor.
- Viewing the effects of photo edits made in zoom view by displaying the entire photo on a different monitor.
- Using one monitor to chat online while using another to surf the Web or answer e-mail.

■ The Setup. To configure Multiple Monitors, you use WinXP's Display

Properties (right-click the Desktop and select Properties). After you install a secondary monitor, the Settings tab in Display Properties includes a numbered icon to represent each monitor. You can click an icon to select different color settings and display resolutions for each monitor. In addition, one monitor acts as your primary monitor. You designate the primary monitor by checking the Use This Device As The Primary Monitor box on the Settings tab. For secondary monitors, check the Extend My Windows Desktop Onto This Monitor box.

After you designate your primary and secondary monitors, your PC and software will start up on the primary monitor. When a program is open, you can drag its window to a different monitor. To specify how your mouse moves between monitors, you arrange the icons on the Settings tab in Display Properties. For example, if you want to drag your mouse from left to right to move or stretch a window to the second monitor, arrange the icons side-by-side with the primary monitor on the left.

Notebook computers have special requirements for monitors and video output. Most notebooks have two video outputs: one for the built-in monitor and one to connect to an external monitor. As previously mentioned, WinXP supports this type of video card with its Dualview feature. Dualview is designed primarily for notebook computers, but you can also use it with desktop computers that contain a video card with two outputs. As with monitors connected to multiple video cards, you configure monitors connected to a single video card with WinXP's Display Properties.

To add Multiple Monitors to your existing system, you need to consider a number of issues related to video cards.

■ What You Need. The key to using Multiple Monitors in WinXP is the video card. The primary and secondary cards must be of a certain type, and WinXP must support the secondary video card. You should also select a card that is compatible with the type of displays you plan to connect to your computer, such as a digital display.

AGP or PCI video cards. Whether you use several video cards or one card with multiple outputs, the card must be an AGP (Accelerated Graphics Port) or PCI (Peripheral Component Interconnect) card. Older style video cards, such as ISA/EISA (Industry Standard Architecture/

Extended Industry Standard Architecture), do not work with Multiple Monitors in WinXP.

Newer computers come with one slot for an AGP card and multiple slots for PCI cards. Your system documentation should note the type and number of slots your computer contains and the card currently installed.

You can also view information about your current card in WinXP. From Start, click Control Panel, click Performance And Maintenance, and then click System. On the Hardware tab, click the Device Manager button. Click the plus sign (+) next to Display Adapters in the list of hardware. The name of the card and an AGP or PCI designation should display.

Note that if your current video processor is on the motherboard and not in an expansion slot, it should automatically disable when you install a new video card. However, you should check your system documentation for specifics about how to integrate additional video cards with your onboard video adapter.

A video card supported by WinXP. The primary video card can be almost any AGP or PCI card, but the secondary card must be an AGP or PCI card supported by WinXP. Likewise, a single card that controls Multiple Monitors must be supported by WinXP. The best resource for video cards supported by WinXP is the Microsoft Knowledge Base article Q307397 (<http://support.microsoft.com, type Q307397> in the search field). The article lists the specific video cards (display adapters) that WinXP supports and identifies those that work with the Dualview feature.

A card that supports your display types. Most video cards are compatible with the standard, VGA (Video Graphics Array)-based monitors. However, you should consider the newer display technologies as well. For example, if you plan to add a television or digital flat-panel display to your computer, make sure the video card supports it.

After you purchase a new video card, follow the manufacturer's instructions to install it in your computer. Connect your monitors and then use the Settings tab in Display Properties to configure the monitors as previously discussed. If you encounter problems with your computer or display after adding a monitor, refer to the following troubleshooting tips for help.

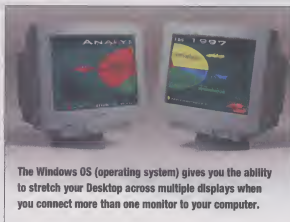
Troubleshooting Tips

To resolve a multiple monitor issue, refer to the section below that most closely matches the

problem you are experiencing. Follow the tips within each section in the order listed. We assume you are adding a second monitor, but note that the tips apply for subsequent monitors.

■ Computer Does Not Boot Into WinXP.

If your computer won't boot properly after you install the second video card or driver, don't panic. With WinXP, you can start your computer using the last known good configuration. To do this, restart your computer. As the computer powers up, repeatedly press the



F8 key until you see a text-only screen with Windows Advanced Options Menu at the top. One of the options is Last Known Good Configuration. Use your arrow keys to select this option and then press ENTER. WinXP should start and display the login screen as usual. Refer to the following tips to identify and correct the cause of the boot problem.

■ Second Monitor Does Not Function.

If your computer is starting as usual, but the second monitor does not function, verify that the monitor's electrical cord is plugged in and that the monitor cable is securely connected to the video port. If the power and connection are fine, continue with the troubleshooting tips below.

Verify that WinXP supports the video card. As noted previously, WinXP supports only specific video cards for secondary monitors. Verify that the card you are using for your second monitor is supported.

Uninstall Adobe Type Manager. Adobe Type Manager, a font management utility, is not compatible with the Multiple Monitors feature in WinXP. You must uninstall Adobe Type Manager if you want to deploy Multiple Monitors. To check whether you have Adobe Type Manager, click Start, Control Panel, and Add or Remove Programs. A list of installed programs displays in alphabetical order. If

Adobe Type Manager is listed, you can remove it by selecting it and then clicking the Change/Remove button.

Check Display Properties. Right-click your Desktop, click Properties, and then click the Settings tab. Click the icon for the second monitor and make sure the Extend My Windows Desktop Onto This Monitor box is checked.

If an icon for the second monitor is not present, the second video card's driver may be missing or outdated, or you installed the card incorrectly. The tips for addressing driver and installation issues follow.

Install the video driver. When you boot up your machine after installing a new video card, WinXP should automatically detect the card and install the correct drivers. However, it is possible that WinXP failed to perform this task or that the new video card is not a Plug-and-Play device. Refer to the installation instructions that came with the video card, which should include information about the driver.

Update the video driver. If you followed the driver installation instructions and your second display is still not

recognized, check for an updated driver. To check the Windows Update site, click Start, point to All Programs, and then click Windows Update. Click Scan For Updates. When the scan is complete, click Driver Updates. If an update for your video card is listed, select and install it. Otherwise, check the manufacturer's Web site for an updated driver and corresponding installation instructions.

Check card installation. If the drivers are installed and current but the second display still isn't recognized, the video card may be installed incorrectly. Turn off your computer, remove the cover, and touch the metal frame of your computer to ground yourself to prevent damage to the computer. Check the video card and make sure that it is fully seated in the expansion slot.

If you are using an AGP card and a PCI card, the PCI card must be in the first PCI slot. (Because computers have only one AGP slot, the AGP card should be in the correct slot.) If you are using two PCI cards, the card for your primary monitor must be in the first PCI slot.

Check BIOS. After you verify that you have correctly installed the video card, the next item to check is your computer's BIOS (Basic Input/Output System). If you are not sure how to access BIOS settings, check your computer's documentation. Normally, you access BIOS by pressing a specific key as the computer starts up.

If you are using an AGP card as the primary card, make sure your computer's display setting in the BIOS is configured to recognize the AGP card first. Many PCs recognize a PCI card first. If your BIOS does not give an option to select the type of video card, check your computer manufacturer's Web site for an updated BIOS.

Adjust Display Settings in Safe Mode. Incorrect display settings can cause display issues that make it difficult to see what is on your screen. If you are experiencing this problem, you can start your computer in Safe Mode. Safe Mode uses only the most basic files and drivers needed to operate your PC. To start in Safe Mode, restart your PC. As the computer powers up, repeatedly press the F8 key until you see a text-only screen with Windows Advanced Options Menu at the top. Use your arrow keys to select Safe Mode and then press ENTER. WinXP will display a login

are using a notebook PC, connect the monitor to a desktop computer. If the monitor still does not work when you turn on the computer, the monitor is probably broken.

■ **Poor Display Quality.** If your second monitor is functioning, but the quality of the display on either monitor is poor, follow the tips below to diagnose and address the problem.

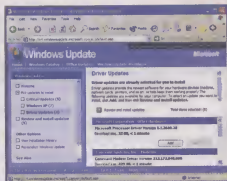
Adjust Display Settings. You can control each monitor's colors, screen resolution, and refresh frequency independently. It's possible that one of these settings is incorrect for your combination of monitor and video card. To adjust the settings, right-click the Desktop, click Properties, and then click the Settings tab. Click the icon for the monitor that is experiencing display problems. Try lowering the Screen Resolution setting first. If this does not work, lower the Color Quality setting. Finally, if these adjustments don't solve the problem, click the Advanced button and check the Adapter and Monitor tabs for a refresh frequency that you can lower.

Check for updated BIOS. Poor display quality can be caused by an outdated BIOS that does not properly support the type of video card you installed. To check for an updated version, refer to your computer manufacturer's Web site.

Check for device conflicts. By using WinXP's Device Manager, you can determine whether your newly installed video card conflicts with another device on your computer. To open the Device Manager, click Start, Control Panel, Performance And Maintenance, and then System. On the Hardware tab, click the Device Manager button. Click the plus sign (+) next to Display Adapters in the list of hardware. Right-click the video card, click Properties, and then click the Resources tab. Check the conflicting device list for any issues.

If a conflict is listed, run the Hardware Troubleshooter in WinXP's Help and Support Center. To access the troubleshooter, click Start, Help And Support, and Hardware. In the topics list, click Fixing A Hardware Problem and then click Hardware Troubleshooter.

Increase the space between the monitors. Depending upon the combination of monitors you have, placing them too close together can cause horizontal or wavy lines to scroll through the display. This is normally caused by electromagnetic interference between the monitors. Try moving the monitors farther apart. If you don't have much space, try placing a shielding material, such as a metal sheet, between the monitors.



The Windows Update Web site automatically scans your computer for updated drivers. If you are having problems with a secondary monitor, you may need to install an updated driver for the video card connected to the monitor.

■ **Some Items Won't Move To The Second Monitor.** If both your monitors are functioning, but you can't place certain items on the second monitor, follow the tips below to diagnose and address the problem.

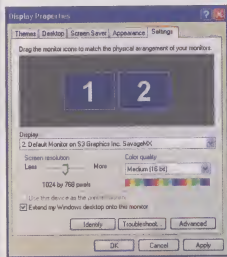
Check for full-screen programs. Some programs, such as games and full-screen DOS applications, override your display settings and take over your entire screen. These applications will run only on the primary display.

Monitors arranged incorrectly in Display Properties. If your mouse is not dragging or stretching items to the second monitor as you expect, check the monitor icons located on Settings tab in Display Properties. To move an icon, click and drag it to a new position. If you want to move items from side to side, the position of the icons should match the physical arrangement of your monitors. If you want to move items between monitors by dragging up and down, you can place the icons one on top of the other even if your monitors are not physically arranged in this manner.

Use WinXP screen savers. If your screen saver is not working on your second monitor, it may not support Multiple Monitors. Switch to one of the screen savers supplied in WinXP, which work across Multiple Monitors.

■ **Increase The Digital Landscape.** If you think you could benefit from the extra workspace, consider expanding your display with Multiple Monitors. The extra real estate is certainly helpful, and WinXP's configuration and hardware tools make Multiple Monitors easy to manage. **18**

by Carmen Carmack



After you add a display, the Settings tab in Windows XP's Display Properties represents multiple displays by using icons. Click the appropriate icon to configure each display's settings.

screen with Administrator as one of the options. Click Administrator to continue.

When the Desktop appears, right-click the Desktop and click Properties. On the Display Properties screen, click the Settings tab and then click the icon for the monitor that is experiencing display problems. The display settings will automatically be set to minimum values. Click OK to accept these values, restart your computer normally, and verify whether changing the display settings to the Safe Mode values fixed the problem.

Check for a faulty monitor. If all else fails, turn off your PC and connect your second monitor to the primary monitor port. If you

Keyboard Crises

Why Won't My Keyboard Work?

It's the way you communicate with your computer and sometimes the world, but keyboards are often taken for granted. The typical keyboard withstands a lot of abuse, and accidents can happen. Fortunately, the more common keyboard difficulties are easily and cheaply resolved with minimal hassle. By following a few troubleshooting steps, you may save yourself the cost and inconvenience of a replacement.

Symptom: When booting up the computer, a beep sounds and "keyboard error" is displayed.

Possible Causes: The keyboard is not connected properly; you are using a misconfigured USB (Universal Serial Bus) keyboard; a key is stuck; the PC is overheated; or the keyboard has completely failed.

Solutions: Turn off your PC and check that the keyboard connector is securely connected. While the computer is powered off, disconnect and reconnect the keyboard to be completely sure. If you are using a USB keyboard, USB must be enabled in Windows or in the BIOS (Basic Input/Output System). In newer systems, this is automatically enabled. Check for stuck keys, and dirt or foreign objects that may be interfering with keys.

Feel around the back of the PC. Check that nothing is blocking the vents. If it feels really warm, some components may be overheating and causing the error. Clear any obstructions, turn off the computer, and let it sit for half an hour. If nothing else works and you can borrow a friend's keyboard, plug that keyboard in to see if the original keyboard has failed. If the second keyboard works, it is probably time for a replacement.

Symptoms: When you press and release a key, it outputs multiple keystrokes, or holding down a key will not repeat the keystroke.

Possible Causes: This is known as a typematic error and is due to an error in the settings for the repeat delay and repeat rates.

Solution: For Windows 98 and Me, the two rates can be adjusted in the Control Panel. Go to Start, Settings, Control Panel, and Keyboard.

The Speed tab should be displayed automatically. Just slide the bar up or down to the desired setting. You can also test the setting in the dialog box. In Windows XP go to Start, Control Panel, Printers & Other Hardware, and Keyboard.

Symptom: The special key under the envelope icon no longer automatically checks your e-mail but tries to play your favorite list of MP3s. In other words, the programmable keys on your multimedia keyboard don't do what you want, or worse, crash your computer.

Possible Causes: The keyboard driver, software that runs the keyboard on your PC, may be incompatible with your computer's OS (operating system).

Solution: Check with the manufacturer to see if it offers an updated version of the driver software. If it does, download and install the new version. If this isn't available, uninstall the driver software on your computer, which will still let the keyboard function at a basic level, without the multimedia functions. If your PC still crashes or you still want the multimedia option, replace the keyboard altogether.

Symptom: The keyboard functions sporadically, or you cannot connect the keyboard to the PC.

Possible Causes: You are using an incorrect port or one or more of the connector pins could be bent, stuck, or broken.

Solution: It is possible you are inserting the connector into the wrong slot. Normally, a symbol is next to the port. Compare the symbol to the connector type. If the connector is simply the wrong size, use the adapter that



converts a large 5-pin din connector to a smaller 6-pin minidin connector (PS/2) or vice versa.

If you have matched the connector to the correct port and it still does not insert easily into the port, check the pins to see if any are bent. It is possible to carefully pry a bent pin back into place with a pair of tweezers, but use caution. If the pin breaks, you will need to replace the keyboard. Pins can also break off and stick in the port.

Not only could this cause a keyboard to function sporadically, but if the pin is not removed, the corresponding pin of any replacement keyboard you install may bend or break, as well.

Symptom: The keys are sticking, and the output is erratic.

Possible Cause: You have spilled liquid on the keyboard.

Solution: Spills are the most common type of keyboard problem, but all is

not lost. First, disconnect the keyboard. If you spilled water, turn the keyboard over and drain as much of the water out as possible. Use a cloth to soak up what you can. Leave the keyboard to air dry for a couple of days. Some people try speeding up the process with a hair dryer, but this is not recommended as you could overheat the components.



If you discover that your connector cable is the wrong size, don't panic. Purchase a simple adaptor to take care of the problem.

It's a good idea to clean your keyboard regularly. You can purchase cleaning kits or just make up your own with cotton swabs, cloths, and a cleaning solution, such as isopropyl alcohol, which evaporates quickly without residue.

If you spilled a soft drink, you may have to replace the keyboard. Sugars leave a sticky residue, causing keys to stick, or worse, corrosion inside the keyboard. You can try to rinse the keyboard with distilled water and then wait for it to dry, but often your only remedy is to buy a new one.

Symptom: The keys are sticking, and the output is erratic.

Possible Cause: Remember that keyboards are mechanical. Springs and other mechanical parts can fall victim to wear and tear. Dirt or other debris, such as hair, crumbs, and paper clips, often land inside the keyboard.

Solution: Disconnect the keyboard. Turn it over and gently shake it to dislodge some of the grime. Try using a can of compressed air to force the fragments out. It's a good idea to clean your keyboard regularly. You can purchase cleaning kits or just make up your own with cotton swabs, cloths, and a cleaning solution, such as isopropyl alcohol, which evaporates quickly without residue. Be certain to let the entire keyboard dry thoroughly before reconnecting it.

Symptom: You've tried troubleshooting the keyboard in various ways and now suspect a keyboard controller error. Entire groups of keys stop working. In some cases, you get an "A20" error on startup.

Possible Causes: It's unusual but not impossible for the keyboard controller to malfunction. The keyboard controller encodes keystrokes into something that the computer can understand. One indicator of this problem is when groups of keys stop working. This is because keys, which are simple switches, are laid out in a rectangular grid. If one of the horizontal or vertical lines that form a circuit connection to the keyboard controller fails, or that pin of the controller is bad, all keys that use that line will be affected.

Solution: Because the keyboard controller is located on the computer's motherboard, you probably want to seek the assistance of a

professional who can tell you if replacing the keyboard controller is practical.

Symptom: My wireless keyboard works intermittently.

Possible Cause: Some brands of wireless keyboards function by transmitting RF (radio frequency) signals between the keyboard and computer motherboard via an RF receiver. However, EMI (Electro Magnetic Interference), which all electrical devices generate, can interfere with these short radio waves.

Solution: Move the receiver closer to the PC. Don't coil up the cable that runs between the receiver and the keyboard port on the

Symptom: My wireless keyboard works intermittently.

Possible Cause: Interference from other devices using the same radio frequency.

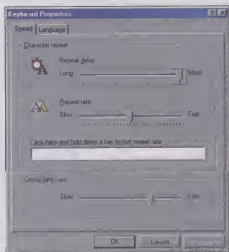
Solution: Different manufacturers of wireless keyboards use different frequencies. Other wireless devices in your home may also use the same frequency as your keyboard. For example, 900MHz is popular for cordless phones and some keyboards. It's hard to tell if interference is the source of the problem, but you may notice that the keyboard stops working properly when you use your cordless phone next to it.

Microwave ovens and Bluetooth and IEEE (Institute of Electrical and Electronic Engineers) 802.11b wireless technologies use 2.4GHz. Again, this could be the same frequency as your keyboard, depending on the manufacturer. If you suspect interference is the cause of the problem, move other cordless devices away. Some keyboards support multiple channels, letting you switch frequencies. If yours does not, your best bet is to disable whichever device you suspect is the source of the interference.

Symptom: My wireless keyboard works intermittently.

Possible Cause: You have a line-of-sight problem with an infrared-enabled keyboard.

Solution: Infrared-enabled keyboards require a clear line of sight to the receiver to function at all. Even a coffee cup or other small objects can negatively affect an infrared keyboard's performance.



In the Speed tab of the Keyboard Properties window, you can adjust the rate at which the characters from the keys you type repeat.

motherboard. The cable acts as an antenna, and leaving it loose and unraveled ensures a more complete signal transmission.

Symptom: My wireless keyboard works intermittently.

Possible Cause: The batteries are flat.

Solution: Replacing the batteries is pretty much your only option. Buy a wireless keyboard that comes with power-management tools to save your battery life. Some keyboards warn you when battery power is low.

■ Keep The Keys Clicking. Keyboards are like cars: regular maintenance prevents major problems in the long run. Keep the keyboard clean, try to avoid spills, and check for a loose connection once in a while. However, even with your best efforts, major failures do occur occasionally. When you have exhausted all of the troubleshooting suggestions you can find, call an experienced technician. The technician's advice may save you from needlessly purchasing a new keyboard or PC. [E]

by Deborah Cooper

Crack Your Printer Predicaments

Tips & Tools Pros Recommend To Resolve Printing Problems

You've surmounted yet another traumatic project deadline using your iron-wrought nerves and quick wits. Now, all that's left to do is add a few more numbers (check), save the file (check), and print (ch...). Whoa, wait a second. Why's the printer light blinking like it's about to explode? Where's my document? What the heck is this "Cannot Communicate With Printer" error message?

Panic ensues. And the project winds up late, all because of one silly printer configuration problem. To help you train for future printer catastrophe, we interrogated some of the finest technical support representatives on the planet about common printer errors. These reps hail from Tech24 (<http://www.tech24.com>) and SupportFreaks (<http://www.supportfreaks.com>), two Web sites that provide live technical support around the clock.

These reps helped us construct a list of printer problems that relate to erroneous system settings and configurations. As you'll soon see, we left out the silly "paper jammed"-type error messages that you already know how to fix. What we did include are the kind of printer troubles that even pros have difficulty diagnosing. For every problem, we've developed a list of troubleshooting steps that will take you from simple to more complex solutions. To get you started, however, we want to review a few fundamentals useful for resolving many printer problems.

■ Troubleshooting Basics. Understanding a few basic processes may help you solve numerous printer issues on your own. First, know how to check your printer's properties. In Windows 95/98 and Windows Me, click Start, point to Settings, and click Printers. In the Printers window, right-click the name of your printer and click Properties. In Windows XP, click Start and then click Control Panel. Click

Printers And Other Hardware and Printers And Faxes. In the Printers And Faxes window, from the File menu, click Server Properties, then click the Drivers tab. This shows the settings in your printer's driver. Compare the settings in this dialog box with the ideal settings in your printer's manual. If you see a discrepancy in these



a system of a corrupted or outdated driver and replacing it with a new one, which you can download from the printer manufacturer's Web site, is fairly easy. First, delete the old driver. In the Printers window, right-click the problematic printer's icon, then click Delete. Now you can work toward installing a fresh driver. For WinXP users, in the Printers And Faxes window, from the File menu, click Server Properties, then click the Drivers tab. Click the driver you want to delete, then click Remove.

Most manufacturer sites have areas designed to make driver downloads as painless as possible. When you find your driver on

its manufacturer's site, simply click the driver's file name and Windows presents you with a Save As dialog box; use this dialog box to save the file in a suitable folder.

After you download the driver, access the Printers window. Double-click the Add New Printer icon. As the Add New Printer wizard progresses, you'll be prompted to select the printer name and manufacturer; instead, click Have Disk and browse to the driver you downloaded.

More help. Installing a new driver won't solve every printer woe, of course, so understanding Windows' built-in Help system will give you an even sharper troubleshooting edge. Win9x, Me, and XP all provide troubleshooting tools for printers. In Win95, click Start and click Help. On the Contents tab, double-click the Troubleshooting topic and double-click If You Have Trouble

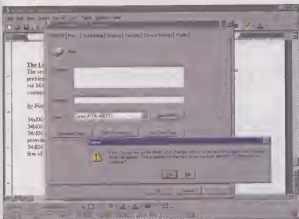
Printing. Win95 users should also note that the Windows 95 Upgrade CD-ROM includes an enhanced printer troubleshooter tool that's more detailed than the built-in troubleshooter. You load this tool by browsing on the disc to OTHER\MISC\EPTS and then double-clicking Epts.exe.

In Win98, click Start and click Help. Click Troubleshooting, Windows 98 Troubleshooters, and Print. In WinMe, click Start, Help, Troubleshooting, Hardware & System Device Problems, Hardware, Memory & Others, and Printing Troubleshooter. In WinXP, click Start and Help And Support. Under Pick A Help Topic, click Fixing A Problem. On the left side of the window, click Printing Problems; on the right side of the window, click Printing Troubleshooter.

There are occasionally situations where fundamental procedures, such as the ones we've suggested, do not immediately help resolve printer issues. Still, this information comes in handy when it's time for you to tackle more daunting problems, including some of the most common printer issues we discuss here.

Problem: "Not Enough Disk Space" error message.

Possible Cause: Your computer needs free disk space to complete a print job. The amount of disk space required depends on the size of the file you're printing.



Having problems moving your thoughts from PC to paper? Take a look at the Printer Properties. It may tip you off to a number of problems, and it also lets you access the New Driver feature.

Solution: Check your free disk space. Double-click the My Computer icon, click your hard drive icon and, from the File menu, click Properties. If you have less than 50MB of free disk space, you'll want to free some up. Delete unnecessary files and programs and be sure to empty the Recycle Bin when you're finished. You may also want to defragment your hard drive and run ScanDisk to optimize your drive.

Problem: The printer feeds blank pages or prints strange characters, or a "cannot communicate with printer" error message appears.

Possible Cause: Problems such as these are often caused by faulty communication between the printer and the computer. There are a number of different reasons that your printer spews garbage, or nothing at all, but the following troubleshooting steps may help.

Solution: Turn off the printer, unplug it from the electrical outlet, plug it back in, and then turn it on again. Turn off the computer for about five minutes, then restart it. Reload your printer drivers. Close all programs except the program from which you're attempting to print. Close the program you're trying to print from and then attempt to print from another application. Try to print a test page from the printer itself. This ensures that the problem is definitely software-related and not a printer hardware problem.

If you've connected the printer through a scanner or other peripheral, reconnect the printer directly to your PC. Replace the

printer cable with a cable you're sure is functional. If all else fails, try the printer with a different PC to make sure it works. If that doesn't help, try a different printer with your PC to ensure that your computer isn't the problem.

Problem: The computer displays a "spool32" error.

Possible Cause: The Spool32.exe program is a Win9x component that manages the spooling of print jobs. Spooling lets the PC's processor quickly process print jobs by temporarily storing jobs on the hard drive before sending them to the printer, a technique that lets you get back to work while the print job executes in the background.

Spool32 errors often occur when the print jobs are incorrectly spooled. Fax and answering machine programs are notorious for causing spool32 errors. Other causes include outdated

your computer. On the flip side, EMF format may speed up your PC but it may make your printer a little sluggish.

Problem: Illegal Operation and GPF (General Protection Fault) error messages generated.

Possible Cause: These errors occur when Windows programs write to a portion of memory already in use by another application. This happens most often when you have many programs running simultaneously, or when you have dozens of program icons on the Desktop; both drain memory drastically. The more memory you use, the more likely the computer is to cause this kind of error.

Solution: Shut down the computer and leave it off for at least five seconds to clear its memory of all programs the computer is running. If the error recurs, press CTRL-ALT-DELETE. In the Close Program dialog box, select any program except Explorer, Sys tray, Rnaap, and your Internet browser program, and then click End Task. Try printing again. Repeat this process if necessary until you've closed every

program but the listed exceptions.

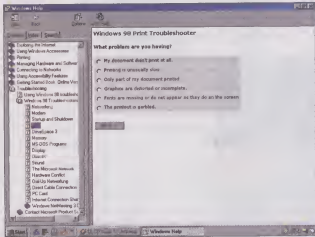
Turn off bi-directional communication between the computer and printer. This lets you print but disables a few advanced, and often unnecessary, printer features. Change the printer spooler settings to Print Directly To Printer. For this particular print job or application, use a Microsoft Universal Print driver.

Edit Windows settings. In Win95, load the Win.ini file in a text editor, such as Notepad, and put a semicolon (;) in front of the lines containing run= and load=. The semicolons basically tell the computer to ignore these lines. After the print job is done, remove the semicolons. In Win98 and WinMe, from the Start menu, click Run. Type msconfig and click OK. Click Selective

Startup and clear the Load Startup Group Items checkbox. These steps should let you overcome illegal operation errors and complete a print job.

Problem: Printer control panel locks up after you print a document using Windows. The buttons do not respond until you disconnect the data cable from the printer.

Possible Cause: A few computers send initialize/reset signals during the startup process. If electronic noise interrupts the reset process the control panel may lock.



You are not alone in the printing battles. Windows is equipped with a Help feature to assist you with printer issues.

printer drivers and TSR (terminate-and-stay-resident) programs that run in the background and sometimes interfere with the Spool32.exe file during PC startup.

Solution: Update your printer's driver. If that does not help, you can change the way the Windows print spooler handles print jobs. In your printer's driver, click the Details tab and click Spool Settings. Click the Spool Data Format drop-down menu and change the setting from EMF (enhanced metafile) to RAW. This forces your PC to translate print job data into printer format, which may slow

Solution: Restart the computer into Windows, turn the printer's power on, and try printing. Ensure you're using a fully shielded, undamaged cable, preferably less than 6 feet long. Try a cable that you're sure is working.

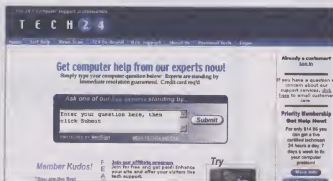
Problem: This error message appears: "Could Not Connect To The Printer: The Remote Procedure Call Failed And Did Not Execute."

Possible Cause: This error occurs when the Windows Registry does not correctly update default printer information after multiple printers are removed or installed.

Solution: When this error message appears, click OK to clear the message, then log off the system and log back on.

Symptom: "Cannot Access Dynamic Link Library Novellnp.dll" error message appears when running the printer's setup software.

Possible Cause: This error occasionally appears when setting up a Windows-driven



Tech24's reps tipped us off to some of the most common printer errors. This site provides technical support 24 hours a day, 7 days a week.

Problem: When you print an OLE (object linking and embedding) object, such as an imported graphic, in Microsoft Office programs, such as Excel or Word, patterned fill may not appear on the printed page.

Possible Cause: Your computer produces patterned fills in proportion to printer resolution. High-resolution printers may mistakenly reproduce these patterns so tightly that it appears to be a solid color.

Resolution: There are two workaround solutions for this problem. Use one of these methods when you need to print in a pinch.

Remove the object from its group, if possible. In your document, right-click the OLE object, select Grouping, and click Ungroup. You'll see a warning message that the object is about to be converted to a Microsoft Office Drawing and that embedded or linked information will be lost in the conversion. If you don't want to permanently convert the object, save another copy of

which the device name printer resides does not have the correct printer driver installed. If you want to install the driver on your local computer, click OK."

Possible Cause: This error message is sometimes attributable to an incompatible or improperly configured Point And Print setup.

Resolution: Point And Print is a Windows feature that simplifies client/server printing schemes. However, sometimes a computer will have a third-party driver that's incompatible with WinXP. Such problems are often best resolved with the system administrator's help; however, using the following workaround may help you print when your IT guy is on the lam.

This workaround lets you install a suitable driver on the client computer and helps you redirect this computer to the correct IPP (Internet printing protocol) URL (uniform resource locator). Click Start, click Control Panel, and double-click the Printers And Faxes icon. Double-click the Add A Printer icon. When the Add Printer Wizard appears, click Next. Click Local Printer Attached To This Computer, then click Next. Click Create A New Port. In the Type box, click Standard Port Monitor, then click Next. Type the IP (Internet Protocol) address of the IPP print server. If you aren't sure what the IP address is, consult a system administrator for the correct entry. Follow the on-screen instructions provided by the Add Printer Wizard, which will assist you in installing the correct driver.

■ You're A Printer Pro. You may not be able to man a technical support line with the information we've provided in this article, but these tips should help you disentangle many frustrating printer issues. Keep this information around for later reference and maybe next time you'll beat your project deadline. **[E]**

by Nathan Chandler



SupportFreaks is a site that offers online technical support, and the company provided a few of the troubleshooting tips for this article.

printer on a Novell network. You may be able to click past this error message. However, after you complete the setup and attempt to access the printer's Properties dialog box, a blue screen may appear and the computer may stop responding.

Solution: Uninstall the printer that's causing problems, uninstall Novell Client, and restart Windows. Download the latest driver for your printer from the printer manufacturer's Web site. After you install the driver, reinstall Novell Client, restart Windows, and attempt to print again. Be sure to complete these steps in this order to complete the process correctly.

this file elsewhere before completing the next step. To save another copy, from the File menu, click Save As, then select a folder in which to save the document. Click Yes to complete the conversion, then attempt to print again.

You can also paste the object into your document as a bit map file. Once you're done creating and formatting the object, click to select it. From the Edit menu, click Copy. Minimize the Office program you're using. Click Start, point to Programs, point to Accessories, and select the Paint program. In the Paint window, from the Image menu, click Attributes. Set both height and width to 1. Click OK. From the

R.I.P. Rodent

Mouse Problems Can Make You Squeal

The computer mouse instantly converts the movement of the user's hand into signals the computer can understand. Although the device was originally created in the 1960s, it wasn't until the Apple Macintosh came along in the 1980s that the mouse gained widespread popularity. Now, it's an integral part of computing, with Logitech (<http://www.logitech.com>) and Microsoft (<http://www.microsoft.com>) producing the majority of the devices.

Problems with your mouse can be frustrating because it's difficult to navigate around the computer screen without being able to simply point and click. You can still get around with keyboard commands, but without the mouse, the computing experience just isn't the same. In this article, we will discuss the different types of mice and tell you what to do when your mouse isn't working.

■ Your Basic Mice. Two types of mice dominate the market: mechanical and optical. The traditional mechanical mouse contains a ball that moves around two axes to determine the pointer's position on-screen. (A trackball is just an upside-down mechanical mouse with a heavier base and a larger ball. Rather than moving the mouse, the user rolls the ball to move the on-screen cursor.) An optical mouse takes pictures of the surface underneath it to determine where you want the pointer on the screen. The mouse connects to the computer in one of three ways: USB (Universal Serial Bus) port, the PS/2 port, or wireless/remote.

The software that tells the computer how to communicate with mice and other peripherals is called a device driver. These drivers need to be present on your hard drive to allow for proper communication. Typically, your OS (operating system) comes with common drivers, such as those for mice major manufacturers make. However, new peripherals typically come with a CD or diskette that contains the drivers you'll need to install before you can use the device.

■ Go Easy. If you are having a problem with your mouse, the experts at Logitech



recommend you try a couple of simple checks to see where the problem lies. Check and

see that the device is plugged into the correct spot and that the plug is pushed all the way in. (Many computers have a small icon of a mouse on the back of the computer where you plug in the mouse cord.) Try the mouse on a different computer and see if it works correctly or try a mouse that you know is functioning properly on the same computer. This will help you determine if it's a problem with the mouse itself. If you are using a PS/2 mouse (a mouse cable with 6 pins that plugs into the PS/2 port), make sure the

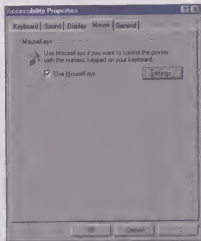
computer is off when you plug the mouse in. If the mouse works well on a different computer, there may be an issue of how the mouse is set up to communicate with the PC, says Don Miller of Logitech.

■ Squeaky Clean. If your mechanical mouse begins skipping or tracking erratically or it becomes harder to push, you may need to clean it. Over time, the mechanical mouse collects gunk in the ball and the buttons on top. When this happens, the mouse will be hard to move and you may have performance problems.

To clean your mouse, unplug it from your computer and turn it over. Remove the retaining ring and remove the device's ball. Clean the roller ball with a lint-free cloth. Use a mouse-cleaning kit, adhesive tape, or simply blow gently into the ball-cage to remove any dust and lint inside. Use a lint-free swab to remove dirt that may have collected on the bearings on which the ball rests. Put the ball back in and replace the retaining ring. Additionally, you can use a toothpick to clean carefully between the mouse buttons to remove dirt and other debris.

Back at the pad. Don't forget to check the condition of your mouse pad. Especially on optical mice, a ripped or torn mouse pad may generate false signals and cause erratic responses. If the mouse pad is damaged significantly, it may cause the ball in a mechanical mouse to perform poorly.

An optical mouse relies upon a sensor rather than a ball and is less prone to failure due to dirt. However, the surface under the mouse can influence its ability to track properly. A glass, mirror, or other shiny surface makes it difficult for the optical sensor to track movement and location and may cause the mouse to function poorly or erratically. Also, some wood grains and grooved surfaces have been known to cause problems. Try using a regular mouse pad or even a simple piece of paper to achieve better results.



MouseKeys lets you use the keyboard to control the mouse pointer on your screen. To turn on MouseKeys in Windows 98 and Me, go to Start, Settings, Control Panel, Accessibility Options, and select the Mouse tab. Click the Use MouseKeys checkbox.

Dissecting The Mouse

A mouse lets you point-and-click your way around the computer with ease. The on-screen cursor moves naturally with the hand's movements, letting users guide their way around drop-down windows, pointing and clicking, and other functions. The experts at Logitech explain that a mouse largely works under the theory of translating your hand's movement into a format the computer can understand. Let's take a look at how a mouse works.



Left/Right-Click Buttons

The left button lets you select an item or double-click to open some programs, among other functions. The right button opens the context menus or Alternate Select.

Scroll Wheel

Some mice feature a scroll wheel, usually positioned between the two buttons, that lets you move along a page as though if you were using the regular scroll bar.



Mechanical Movement

Mechanical mice have a small ball underneath them. When the ball moves, it turns two axles inside the mouse. One axle tracks the horizontal movement while the other tracks the vertical movement. At the end of each axle is a wheel that contains gear-like notches. An optical sensor reads the motion of the wheel and an onboard processor converts the motion into a binary code the computer uses to move the position of the on-screen cursor.



Optical Movement

An optical mouse relies on an optical sensor rather than a ball to track movement. The optical sensor captures up to 2,000 images each second. An onboard digital signal processor compiles the images and uses an algorithm to determine where the mouse is at currently.

Wireless problems. If your wireless mouse is experiencing problems, check to see if the batteries are running low. Those using a wireless mouse will experience improved battery life by using the mouse on a white sheet of paper. This is because white objects reflect more light than dark objects. When more light is reflected, the LED (light-emitting diode) inside the mouse needs to emit less of its own light and will conserve battery power. Also, make sure you are within range of the mouse receiver. Cordless mice typically work as far as 6 feet from the receiver. Anything farther could cause problems.

On track. If you are experiencing trouble with your trackball, it could be because the ball is not positioned correctly in the cage. Three ball bearings hold the ball in its proper position in the ball cage. If one or more of the ball bearings gets moved or comes out, the ball will not sit evenly and the mouse movement will be affected. Opening the ball cage to inspecting the three ball bearings. You can usually order replacement parts from the manufacturer.

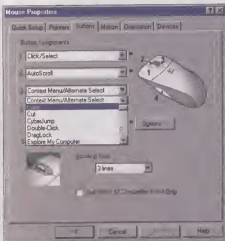
■ **Not The Physical.** Some bad mouse behavior may not actually be an error but a reflection of how the mouse has been set up. The problem could lie in the mouse settings. For example, if your mouse moves too quickly or the double-click doesn't seem to respond consistently, you might want to adjust your mouse settings.

To change the settings for your mouse in Win9x, NT, 2000 and Me, go to Start, Settings, Control Panel, and select Mouse. Under the Motion tab, you may adjust the rate that your mouse pointer moves around the screen. Have some fun with tails, which leave a path behind the pointer as it moves. This is helpful if you have trouble identifying the location of the pointer on the screen. Under the Buttons tab you will be able to change the actions that occur when you click, right-click, and double click. Select Options to change the double-click speed to a level that is comfortable for you.

(In WinXP, click Start, Control Panel, Printers And Other Hardware, and Mouse.) Click the Buttons tab to change the functions that occur when you click a certain button. The Motion tab lets users change the cursor speed. Click OK when you are finished. (In WinXP, select the Pointer Options instead of Motion tab.)

Use the Device Manager. The Device Manager will help you troubleshoot errors.

Although your mouse makes things *convenient*,
you can get by without the critter, at least in most Windows applications.



Mouse Properties lets you change several features pertaining to your mouse, including the functions of the mouse's buttons.



Mouse maker Logitech on its site (<http://www.logitech.com/ci/support/mouselist.cfm>) offers several help documents relating to its mice. If you have a Logitech input device and it's giving you problems, check this site first.

To access the Device Manager, Click Start, Settings, and Control Panel. Select System and then select the Device Manager tab. In the list of devices, double-click Mouse (or Mice And Other Computing Devices in WinXP) to view the mice connected to your PC. If there is an exclamation point (!) or a red "X" on the mouse icon, the mouse is experiencing a software-related problem.

Typical Problems. USB errors may also occur whenever you plug in too many peripherals, such as a printer or a digital camera, into an unpowered USB hub. If your USB mouse is only acting up when you are

using other peripherals, you may be overloading the bus. To resolve this, you will want to install an additional bus card or unplug some of the devices.

Game fix. You may notice your mouse buttons don't respond correctly when playing video games but work fine in other Windows applications. This may be happening because you modified your button action settings from their original setting and these new assignments conflict with the assignments used by the game software. To correct the situation, simply reset your button assignments to the default settings. To reset your button assignments in Win9x, NT, 2000 and Me, go to Start, Settings, Control Panel, and select Mouse. In WinXP, click Start, Control Panel, Printers And Other Hardware, and Mouse.

Wait to plug. If you start up your computer with the PS/2 mouse not plugged in, you will not be able to correct the issue by simply plugging the device into the computer. You will need to shut down the machine, plug in the device, and reboot the system. By contrast, those with USB mice will be able to plug in the pointing device when the computer is on. That's because the computer automatically recognizes all USB devices as soon as they are plugged in.

Won't plug in. If you have trouble plugging the mouse into the PS/2 port, take a look at the end of the cable. Examine all the pins. Make sure that each is straight and can easily be pushed into the port. Over time, the cable pins can become crooked and won't plug in properly. If a poor connection is made, you may experience difficulty with the mouse.

Other drivers. If you install third-party video drivers, such as when you add a big-screen monitor, your on-screen pointer may move or behave erratically. It may also corrupt the appearance of images on the screen. This happens because the mouse driver and the video driver are sending competing information about the screen's appearance. To resolve the issue, try changing the video mode or change the driver to the default setting of VGA to see if the video symptom is resolved. If the symptoms disappear, there is a video driver conflict. Contact

the manufacturer of the video card or Microsoft to obtain the latest video drivers.

MouseKeys. Although your mouse makes things convenient, you can get by without the critter, at least in most Windows applications. A user with Win9x/Me can modify his computer to let the keyboard control the mouse pointer. MouseKeys is a handy feature for a user who needs a high level of precision, as is needed in graphic-design work.

To use MouseKeys, press CTRL-ESC to bring up the Start menu; use the arrow keys to highlight Settings and press ENTER. Control Panel should already be highlighted or you can select it with the arrow keys, then press ENTER. Use the arrow keys to select the Accessibility Options icon and press ENTER. Press SHIFT-TAB to select the Keyboard tab and then press the right arrow until the Mouse tab is selected. Press ALT-M to select the Use MouseKeys checkbox. To configure the MouseKeys options, such as speed and acceleration, press the S key. Pick your options and press ENTER.

Once you are all set up, the numeric keypad lets users move the pointer around. The arrows on the 2, 4, 6, and 8 let users move up and over. The 5 key is a click, and the plus sign (+) is a double-click. To drag an object, move on top of the item and press Insert to begin dragging. Delete will release the item. The minus key (-) followed by the 5 key is a right-click. The CTRL button lets users jump across the screen. To move only one pixel at a time, hold down the SHIFT key while making movements.

Click, Don't Click. For those who want to resume pointing and clicking and still have mouse problems, Logitech and Microsoft offer online support and some tips for figuring out what went wrong. When trying out possible solutions to your mouse woes, be sure to make only one change at a time so you can rule out possible problems. Then again, with prices as low as \$20 each, it may be just time to upgrade to a new mouse. **[S]**

by Rebecca Rutawing

File Fallout

Ways To Find Lost Files

It's about time we updated some common sayings to reflect a society enmeshed in technology rather than one based on outdated practices. For instance, instead of warning that a stitch in time saves nine, it seems more appropriate to say a virus scan in time saves your data. Or who wants to count chickens before they hatch when we should be wary of counting Web riches before a market crash? And why complain about needles in haystacks when it's just as difficult to find files on hard drives?

We all can relate to the lessons of modern life, especially that one about lost files on a hard drive. How many times have you sat down at your PC to work on a document or digital image only to find yourself muttering obscenities as you search through folders and storage drives for a file you were sure you had. Even if it's only happened once, you have to agree that's one time too many.

Where To Look. A data file is different from its hard copy counterparts, which you can tack to bulletin boards or file in locked cabinets for safekeeping. A data file is really nothing more than a collection of digital bits stored on a hard drive, diskette, or other storage device or media, along with tens, hundreds, or thousands of files that—from your perspective, anyway—look just like it. The good news is that you can retrieve these files in most cases. You just have to know where and how to look for them.

Recycle Bin. The most likely cause of a lost file is accidental deletion. Consequently, the first place to look is the Recycle Bin. The Recycle Bin holds all of your deleted files until you manually dump its contents for good. You can view the contents of the Recycle Bin by double-clicking the Recycle Bin icon on the Desktop.

If the Recycle Bin is full, you can simplify your search by opening its View menu and selecting the Arrange Icons, By Name option. This organizes the files alphabetically, making it a little easier to locate the file in question (provided you know its name).

Once you find the lost file, highlight it, open the File menu, and click Restore. The Recycle Bin will return the file to its original location on the hard drive.

Download folders. It is possible to download a file that you immediately lose on the hard drive because you failed to note where you were saving it. Fortunately, downloaded files typically end up in one of two places: the Downloaded Program Files subfolder located inside the Windows folder or the folder to which you have previously downloaded files from the Internet.

For example, if you downloaded a file to the My Documents folder yesterday, it's likely that a file you download today will end up in the same folder, unless you specify that you want it saved elsewhere.

Hidden files. It's also possible that your files are just hiding. To learn about hidden files, see "Files In Hiding" on page 133 in this issue.

The Search function. Finally, you can try to find that lost file with the Windows Search tool. Access it by opening the Start menu, choosing the Search command (or Find in Windows 98), and selecting the Files And Folder option.

In the Search For Files Or Folders Named field (the Named field in Win98 or the All Or Part Of The File Name field in Windows XP) of the resulting dialog box, type the name and file extension of the missing file. Select the drive letter corresponding to the Windows drive (the drive where Windows is installed) from the Look In field, and then click the Search Now (Find Now in Win98) button. A list of matches soon will appear on-screen.

Note that the Search utility supports two wildcard characters: the question mark (?)

and the asterisk (*). Use the question mark when you are uncertain about a particular character in the file name. If you can't remember whether your lost document was named Work.doc or Wonk.doc, for instance, you should type wo?k.doc in the Search For Files Or Folders Named field.

Conversely, use the asterisk to represent several unknown characters in the file name. For example, if you know the lost file was a JPG image of Michael Jordan, but you can't remember whether you named it Mjordan.jpg or Mjordanpic.jpg or Jordanpic.jpg, you would type *jordan*.jpg in the Search For Files Or Folders Named field.

If At First You Don't Succeed . . . The aforementioned methods will find almost any file that gets lost on your system. If they don't, you have bigger problems to worry about. Files that seem to disappear without a trace were most likely obliterated by a virus, destroyed by drive corruption, stolen by an intruder, or deleted and emptied from the Recycle Bin. The only way to recover these files is with the help of a data recovery service, such as DriveSavers (<http://www.drivesavers.com>) or Ontrack Data International (<http://www.ontrack.com>). **IS**

by Jeff Dodd



Startup Setbacks

Why Won't My Computer Boot Up Properly?

Some technologies work so well that we take them for granted. Flip a light switch, for instance, and the room brightens up. Turn the handle on the sink, and water comes out. Adjust the thermostat, and your furnace clicks on. We become so conditioned by the reliability of these devices that we are truly shocked when they fail to work properly.

If only the same could be said of personal computers.

Sure, PCs have come a long way in the area of dependability. The latest OSes (operating systems) are able to identify and resolve many of the issues that would have caused serious problems several years ago. The steady move toward common hardware and software standards also has decreased the likelihood of errors when booting up (turning on) a computer.

Nevertheless, system startup still feels like a crapshoot for far too many users. Until PCs prove to be as reliable as television sets, toasters, and other household appliances, you must learn to deal with common startup problems.

Most of the problems addressed in this article apply to Windows 98 and Windows Me. This is because these OSes are based on the volatile Windows 9x kernel (a module of code that underlies all the other functions of the OS) rather than on the stable Windows NT kernel. Windows XP is based on the WinNT kernel, and therefore, is less susceptible to problems during startup . . . or any time, for that matter.

General Problems

Perhaps the most common—and most frightening—startup problems are those that are not the fault of the OS at all. If you experience one of the following symptoms, make sure you take a deep breath and check out the possible solutions before cursing Bill Gates and company.

Symptom: You press the power button on the computer and nothing happens. No whirrs, no beeps, and no flashing lights. Nothing.

Probable cause: The computer isn't receiving any power.

Solution: Check the power cord connections. Make sure the computer's power cord is plugged into a wall outlet or a power strip (and the power strip is plugged into a wall outlet and turned on). If that doesn't work,



you may have a blown fuse or broken circuit breaker on your hands. Contact your office custodian to fix the problem or make the repair yourself if you're at home.

Symptom: The monitor screen stays black when you turn on the computer.

Probable cause: The monitor is unplugged or turned off, or you may need to adjust its settings.

Solution: Like the computer, make sure the monitor is snugly plugged into a live wall outlet or power strip. After doing this, press the monitor's power button to ensure that it is getting electricity (the little light on the front of

the monitor should light up). Next, check to see that the monitor is connected to the video port on the back of the PC. Finally, adjust the monitor's color, brightness, and contrast settings to the default position; refer to the users manual for instructions on how to access and configure these settings.

If the above steps do not help, the monitor or video card has probably stopped working. You can verify this diagnosis by connecting the monitor to another computer. See "Flicker Flicker" on page 79 for more information about monitor-related problems.

Symptom: Error message: "Nonsystem disk or disk error. Replace and strike any key when ready." or "Invalid system disk. Replace the disk and then press any key."

Probable cause: There is a nonbootable floppy diskette in the diskette drive.

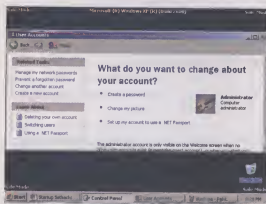
Solution: Remove the floppy from the diskette drive and reboot your system. If that doesn't work, the error message most likely indicates a problem with the MBR (master boot record).

The MBR is a set of instructions that tells the computer where to find Windows on the hard drive. It is a crucial part of your system, but your PC may not be able to access the MBR if a virus has infected it or if another program, such as a security utility or hard drive management application, has overwritten it. Contact your antivirus software developer if you suspect a virus; contact the software developer if you think another program (probably one you installed recently) overwrote the MBR.

Symptom: Error message: "Boot failure. Insert boot diskette in A:. Press any key when ready."

Probable cause: The hard drive is not connected properly or has malfunctioned.

Solution: Open your PC and check the power and data cables that connect to the hard drive (refer to the users manual for information about where the hard drive is located in your PC). Make sure the cables connect securely. If they are and you continue to get this message, the hard drive has succumbed to a virus infection, rampant data corruption, or



The only way to access the Administrator account in Windows XP is in Safe Mode. Trying to access it in Normal Mode may cause you to receive an error message.

simple mechanical failure. Contact the hard drive or computer manufacturer for assistance in determining your options.

Symptom: Error message: "Unable to log you on because of an account restriction."

Probable cause: You are trying to log in to WinXP with the Administrator account.

Solution: You must log on to the computer with another User account. Microsoft designed WinXP to permit access to the Administrator account only in Safe Mode. If you need to access the Administrator account for some reason, such as to add an owner account or change the password, you must restart your PC and press the F8 key as soon as the system begins to boot up. From the resulting Startup menu, select the Safe Mode option.

This problem only affects WinXP users.

Missing Or Damaged Files

It may be hard to believe, but the absence or corruption of just one of the thousands of files associated with your OS can thwart every attempt to boot the PC. The solution in most cases is to identify the file in question and replace it.

Symptom: Windows shuts down after displaying the following error message: "Error loading kernel. You must reinstall Windows."

Probable cause: The Kernel32.dll file is absent or corrupt.

Solution: You need to replace the Kernel32.dll file. The first step in doing so is to boot your system to a command prompt. You can do this by holding down the CTRL key as you reboot the PC, and then selecting the

Command Prompt Only option when the Startup menu appears on-screen. At the prompt, type `cd \windows\system` and press the ENTER key; then type `ren kernel32.dll kernel32.old` and press the ENTER key again. This ensures that the existing Kernel32.dll file, if present, will not interfere with the solution.

Next, you need to install the new Kernel32.dll file. There are several ways to do this, and each is long and tedious. The most common procedure involves extracting the file from the Windows installation CD-ROM. You can get things started by putting the Windows installation CD-ROM in the disc drive and the Startup Disk in the diskette drive. When you reboot your PC, a Startup menu will appear on-screen. Select the Start Computer With CD-ROM Support option and press ENTER. A command prompt should appear on-screen.

If you're using Win98, the next thing you should do is type `extract /a d:\win9x\base4.cab kernel32.dll /l c:\windows\system` (where *d*: represents the drive letter associated with the disc drive and *c*: represents the letter associated with the hard drive) at the command prompt. In WinMe, type the same thing, except substitute *base2.cab* for *base4.cab*. Either way, press the ENTER key to extract the Kernel32.dll file to the appropriate location on the hard drive. Next, remove the Startup Disk and installation CD-ROM from their drives and reboot the PC.

This is not a known problem with WinXP.

Symptom: As soon as the WinXP Startup screen appears, the computer restarts. The process repeats until you power down the computer.

Probable cause: A damaged or missing Kernel32.dll file.

Solution: You need to replace the Kernel32.dll file. The Windows Recovery Console can help you do so.

To use the Recovery Console, insert your WinXP installation CD-ROM in the disc drive and reboot the computer. Immediately upon restarting, the computer will display a "Press Any Key To Boot From CD" message. This message appears briefly, so stay alert and press any key on the keyboard as soon as you see the message. The computer will search the disc for startup instructions and then present a list of setup options. Press the R key to launch the Recovery Console.

The next few steps vary, depending on how you configured your system. For example, if you have two or more OSes installed on the PC, your system will ask you to select the one you want to repair. Type the number corresponding to WinXP and press the ENTER key. Your system also may ask you to enter the Administrator password. Type the password when prompted and press ENTER. Note that the Recovery Console will exit and restart the computer if you do not provide the correct password in three chances.

After successfully logging in to the Recovery Console, you will reach a command prompt. Type `cd system32`, press ENTER, and then type `ren kernel32.dll kernel32.old` and press ENTER again. Finally, type `expand d:\i386\kernel32.dll` (where *d*: is the drive letter associated with your disc drive) and press ENTER.

You'll know the replacement is complete when the "Kernel32.dll 1 File(s) Expanded" message appears on-screen. Remove the WinXP installation CD-ROM from the disc drive and type `exit` at the command prompt to reboot your PC.

This problem only affects WinXP.

Symptom: Error message: "TASKMON caused an invalid page fault in module Kernel32.dll." or "EXPLORER caused an invalid page fault in module Kernel32.dll."

Probable cause: The Windows Task Monitor was unable to update a system log file(s) because the file(s) was damaged.

Solution: You need to eliminate the damaged file. Once it is out of the way, Windows will create a clean log file and you won't receive the error message anymore. The easiest way to get rid of the damaged file is to rename the Applog folder.

Start the computer in Safe Mode by pressing and holding down the CTRL key as you reboot Windows. Select the Safe Mode option from the Startup menu and press the ENTER key. After Windows boots completely and you close any Desktop messages or Help And Support windows you see, double-click the My Computer icon. In the resulting window, select Folder Options from the View menu (in Win98) or Tools menu (in WinMe).

When the Folder Options dialog box appears on-screen, click the View tab. Activate the Show Hidden Files And Folders option (it's called Show All Files in Win98), which is located in the Advanced Settings field, and

then click OK to save the changes and return to the My Computer window.

Next, double-click the icon corresponding to the **Windows drive** (the drive where Windows is installed). In the resulting window, open the Windows folder and locate the Applog folder. Right-click it and select the Rename option from the pop-up menu. Type **Appold** and press ENTER to rename the folder. After you reboot the computer and ensure that your system is back to normal, you can dig back into My Computer and delete the Appold folder.

This is not a problem with WinXP.

Symptom: Upon startup, your computer restarts automatically and opens the Startup menu with the Safe Mode option selected by default. If you try to open Windows in Normal Mode, you receive an error message: "Invalid VxD dynamic link call. Your Windows configuration is invalid. Run the Windows Setup program again to correct this problem."

Probable cause: The System.ini file is corrupt or damaged.

Solution: You need to replace the System.ini file. To do so, you must boot your computer in Safe Mode, open the Folder Options dialog box, and choose to view all files. While you're in there, deselect the Hide File Extensions For Known File Types option. Click OK to save your changes and exit.

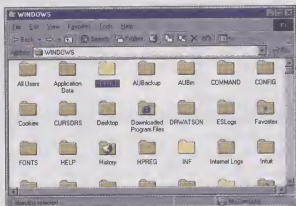
Next, double-click My Computer and open the Windows drive. Within the resulting window, open the Windows folder and locate the System.ini file. Right-click it and select Rename from the pop-up menu. Type **system.old** and press ENTER.

Now it's time to retrieve a clean version of System.ini. Locate the Sysback subfolder (you'll find it inside the Windows folder on the Windows drive) and open it. Within this folder are several Rb00*.cab files (where * represents a number between 0 and 5) that contain backup copies of key system files taken during the previous week. Open the View menu, select Details, and maximize the Sysback window so you can view the dates for each of the Rb00*.cab files. Double-click the one bearing a date that immediately precedes the date you first received this error message.

Next, a window containing several files will appear on-screen. Locate the System.ini file in this window, right-click it, and select Extract

from the pop-up menu. The Browse For Folder dialog box then displays on-screen. Use its hierarchical folder structure to locate and highlight the Windows folder on the Windows drive, and then click OK and reboot your PC. If you receive the same error message, repeat this process using another Rb00*.cab file that predates the problem.

This problem reportedly only affects Win9x and WinMe.



Renaming the Applog folder is the easiest way to cleanse your system of corrupt log files. We chose to rename the folder Appold, but you could call it anything you want.

Symptom: Error message: "Invalid VxD dynamic link call from VWIN32." or "Fatal exception OE has occurred in VxD VWIN32."

Probable cause: You have a damaged or corrupt Windows Registry (database of system settings and user preferences) on your hands.

Solution: Restore the Registry. To do so, you need to boot to a command prompt (hold down the CTRL key as you reboot the PC and select the Command Prompt Only option when the Startup menu appears on-screen).

At the command prompt, type **cd\windows\command** and press ENTER. Type **scanreg /restore** and press ENTER.

A list of restored Registries will appear on-screen. Select one marked as "Started" and press ENTER. A notification message will indicate that you restored a working Registry. Finally, restart the PC.

This error applies only to Win98 and WinMe.

Software & Hardware Conflicts

The amount of software and hardware available for use with

your PC is staggering. It's little wonder that Windows occasionally stumbles when it encounters a program here or a peripheral there. These conflicts often make themselves known through startup error messages.

Symptom: Error message: "Stimon caused an invalid page fault in module Kernel32.dll."

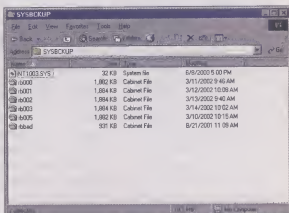
Probable cause: There is a conflict between your USB (Universal Serial Bus) imaging device and the Stimon.exe file. Several things may have caused this conflict, such as a corrupt Stimon.exe file, the improper installation of a USB imaging device and software, or the incomplete removal of the USB imaging device and software.

Solution: In all three cases, you need to rename the Stimon.exe file, edit the Registry, and reinstall your USB imaging device and software. But first, you must unplug all USB devices from the USB ports (they're typically located on the front or back of your PC).

Once your system is free of all USB devices, you should insert your Startup Disk in the diskette drive and reboot the computer. If you choose the Minimal Boot option from the resulting menu, a command prompt will appear on-screen. Type the following lines, pressing ENTER after each:

```
cd
cd \windows\system
ren stimon.exe stimon.old
```

Now it's time to edit the Registry. Restart the PC in Safe Mode, open the Start menu, and



You can recover clean versions of key system files by looking in the Sysback folder on the Windows drive. Just make sure you arrange the files in the Details view so you can see which Rb00*.cab file has the most recent date.

select Run. In the Open field of the resulting dialog box, type regedit and click OK. The Registry Editor will open on-screen.

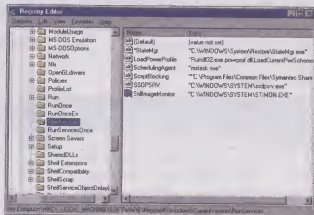
(NOTE: Editing the Registry isn't something to take lightly. In fact, Microsoft doesn't want casual users to even mess with the Registry. So, before making any changes to the Registry and playing with the Registry Editor, we strongly recommend that you back up the Registry first.)

In the Registry Editor window, burrow through the HKEY_LOCAL_MACHINE, Software, Microsoft, Windows, and Current Version folders to access the Run folder. A list of keys will appear in the right pane of the Registry Editor. Locate the StillImageMonitor key. If you don't see it there, look in the right pane of the Registry Editor. Locate the RunServices folder (you'll find it a few folders below the Run folder) instead.

Next, open the Registry menu and select Export Registry File. In the resulting dialog box, make a note of the Save In location and type run key in the File Name field. Click the Save button to save the key to your hard drive. After that is out of the way, right-click the StillImageMonitor key and select Delete from the pop-up menu. Confirm that you want to delete the key by

clicking Yes in the confirmation message box, and then close the Registry Editor and reboot the PC.

This error message is only associated with WinMe and Win9x.



When troubleshooting a conflict between the USB (Universal Serial Bus) Imaging device and the Stimon.exe file, look for the StillImageMonitor key in the Run Services folder if you can't find it in the Run folder initially. And whatever you do, be careful. A relatively minor mistake in the Registry can have fatal consequences for your system.

Finally, you need to reinstall the imaging device and its software. This will force Windows to load a clean version of the Stimon.exe file, which should eliminate the error message. Once your system is running fine again, you can delete the Run Key that you exported to the hard drive.

utility will open on-screen. Review the list of currently installed programs, highlight CleanSweep, and then click the Change /Remove button. Windows will remove the application. Reboot your PC when it's done.

This problem only relates to WinXP.

Symptom: After upgrading to WinXP from an earlier version of Windows, you receive the error message: "Explorer.exe has generated errors and will be closed by Windows."

Probable cause: A conflicting version of Norton CleanSweep was installed on your PC prior to upgrading to WinXP.

Solution: You need to remove Norton CleanSweep. To do so, restart your PC and press the F8 key as soon as the boot process begins. From the resulting list of options, choose Safe Mode Command Prompt and press ENTER.

Your system will ask you to log in using your username. Next, you'll access a command prompt. At the prompt, type appwiz.cpl and press ENTER. The Add/Remove Programs

A Bit About Beep Codes

Reading error messages is one thing. Deciphering beep codes is another. A beep code is a series of beeps that indicates a problem encountered by the BIOS (Basic Input/Output System); software that controls the startup process and launches the OS (operating system) during its POST (power on self test); a routine executed by the BIOS to ensure that the computer's primary components are working properly). Learning to recognize these beep codes is one way to take your troubleshooting skills to a new level.

Unfortunately, there's no easy way to do that because beep codes vary widely. Some consist of a specific number of beeps

(three beeps indicate a memory problem; six beeps indicate a keyboard problem), and others comprise a sophisticated sequence of beeps. For example, a memory error is revealed by one short beep, a pause, three short beeps, a pause, four short beeps, a pause, and one short beep. Keyboard errors are revealed by one short beep, a pause, three short beeps, a pause, one short beep, a pause, and three short beeps.

Consequently, the first thing you need to do is determine the exact beep sequence. Count the number of beeps you hear and determine whether there is a pattern. Of course, this may be easier said than done.

The next thing you need to do is interpret the codes; and you can do that only if you know the BIOS type and manufacturer. Your system often presents this information within the BIOS Setup program, which you can access by pressing a designated key (typically the DELETE key or one of the Function keys) immediately after starting the computer. If the resulting BIOS Setup screen does not contain the BIOS name and version number, you can try to obtain the information by contacting the PC manufacturer or reviewing the documentation that came with your computer.

Finally, it's time to visit the BIOS manufacturer's Web site to find an explanation about what a

particular beep code means. You can view a description of beep codes for AMI BIOSes, for instance, by accessing its online PDF (Portable Document Format) file about the topic (http://www.ami.com/support/doc/beep_codes.pdf). And you can find out all about Phoenix beep codes by accessing its own online PDF file (<http://www.phoenix.com/pouiser/PDF-Files/bios-postcode.pdf>). Note that the explanation only tells you where the problem lies, such as system memory or the keyboard; it cannot tell you what caused the problem or how to fix it. For that, you'll have to contact the manufacturer of the affected component for troubleshooting assistance. □

Memory Problems

Windows performance depends on an appropriate amount of system memory. That means not too little and not too much. It also means your system must properly allocate the memory. If system memory fails to meet the basic requirements of quantity and proportion, errors will occur.

Symptom: Error message: "Not enough extended memory available to run Windows." or "Quit one or more applications to increase available memory or restart your computer. Press any key to continue."

Probable cause: The System.ini file has too many TTFontDimenCache entries.

Solution: Simply remove the extraneous entries from the System.ini file. Reboot your PC and hold down the CTRL key to access the Startup menu. Choose the Command Prompt Only option and press ENTER. At the prompt, type `cd \windows` and press ENTER. Make a copy of the System.ini file by typing `copy system.ini system.old` and pressing ENTER again.

Now you're ready to edit the file. Type `edit system.ini` and press ENTER. The contents of the file will appear on-screen in the file editor. Scroll down to the [TTFontDimenCache] section and delete any duplicate entries from the section.

After your deletions are complete, the section should have one heading and 16 entries. Open the File menu and click Save to save the changes, and then close the file editor by opening the File menu again and selecting the Exit option.

This error applies only to the WinMe and Win98 OSes.

Symptom: Error message: "Insufficient memory to initialize Windows. Quit one or more memory-resident programs or remove unnecessary utilities from your Config.sys and Autoexec.bat files, and restart your computer."

Probable cause: Your computer has too much memory.

Solution: A quirk in Win98 and WinMe may cause you to receive an insufficient memory error message even though your system has far more memory than is required. To resolve the issue, trick Windows into thinking it has only 512MB of RAM at its disposal. To do this, adjust the MaxFileCache setting in the System Configuration Utility.

To change the MaxFileCache setting, access the System.ini file editor (as described previously) and locate the [Vcache] setting. Change the MaxFileCache= setting to equal 524288. Save the changes and exit the file editor.

Next, you need to access the System Configuration Utility. Reboot the computer into Safe Mode, open the Start menu, and select Run. Type `msconfig` in the Open field of the Run dialog box. The System Configuration Utility will now appear on-screen. Click the Selective

Startup option and click the Advanced button. Find the Limit Memory To option and click it so that a check mark appears next to it. Change the corresponding memory setting to 512. Click OK to exit out of the System Configuration Utility, and then reboot your PC.



Your PC should have only one Explorer.exe file, and that file should reside in the Windows folder on your hard drive. If you see an Explorer.exe file anywhere else on your hard drive, change its name to Explorer.old and delete it from your system when you reboot to Normal Mode.

This should fix the problem. If not, you may have to physically remove some memory modules so the PC ends up with no more than 512MB of installed RAM.

Symptom: The screen turns blue after upgrading the system memory to an amount in excess of 1GB.

Probable cause: Your system has too much memory.

Solution: Physically remove some memory modules so the computer ends up with 512MB or less of RAM. This is a problem with only Win98 and WinMe.

Upgrade Errors

Microsoft loves it when you upgrade from an older version of Windows to a newer version of Windows. Unfortunately, such an upgrade has a relatively high likelihood of resulting in a startup error message.

Symptom: Error message: "Explorer: This program has performed an illegal operation and will be shut down. If the problem persists, contact the program vendor."

Probable cause: A previous version of the Explorer.exe file is stuck on the hard drive.

Solution: In Win98 and WinMe, the Explorer.exe file is stored in the Windows folder. If you have an old copy of this file stored elsewhere on the hard drive, your computer becomes confused and crashes. You need to eliminate this old copy (which is most likely left over from your days of running Win95). To do so, you need to reboot your computer to a command prompt.

Next, at the command prompt, type `ren c:\explorer.exe explorer.old` (where `c:` is the drive letter associated with your Windows drive) and press ENTER. Restart the computer. When Windows loads without error, open My Computer and locate the Explorer.old file on the Windows drive. Right-click it and select the Delete command from the pop-up menu. That's all there is to it.

This problem affects only Win98 and WinMe.

■ **Start All Over Again.** Obviously, these are not all of the problems that can trip up the startup of a Windows OS. If you encounter an error when booting your PC, read the message carefully and write it down. Take special note of any files or programs mentioned, and think back to any changes you may have made to the computer system immediately prior to receiving the error message. This information will be valuable in the event that you have to contact technical support for assistance. **LE**

by Jeff Dodd

Mysterious Icons

How To Handle Disappearing Shortcuts



Desktop or Taskbar icons sometimes play by their own rules. Occasionally, they'll disappear and reappear in places other than where you left them. Other times, they'll trade pictures with each other but otherwise function fine. This article will help you corral ornery icons, keep them where you want them, and ensure they work correctly.

■ Icon Cleanup. Before you do anything drastic to fix icon problems, don't overlook glaringly obvious solutions. If your computer has multiple accounts, for instance, make sure you're not looking at someone else's Desktop.

If your Desktop icons won't stay in one place, you may have a setting enabled that lets your icons arrange themselves automatically. To turn off this feature, right-click your Desktop, select **Arrange Icons**, and uncheck **Auto Arrange**.

Sometimes applications or games change your screen settings, so make sure your resolution and color depth are set correctly according to the manufacturer of your video card.

If your icons appear garbled or use the wrong images, your icon cache file may be corrupt. This file stores Taskbar, Desktop, Start menu, and program icons so Windows can display them quickly. The icon cache sometimes becomes corrupt after a system crash or installation failure. However, if you delete the icon cache, Windows automatically rebuilds a clean one. In Windows 98 and

Windows Me, delete the hidden file `ShellIconCache` found at: `C:\WINDOWS\ShellIconCache`. In Windows XP, delete the file `IconCache.db` found at: `C:\DOCUMENTS AND SETTINGS\USERNAME\LOCAL SETTINGS\APPLICATION DATA\IconCache.db` (where `USERNAME` is your account name).

If you don't see these files, you may need to change the system setting so you can view hidden files. Right-click the **Start** button and choose **Explore**; when Windows Explorer opens, click **Folder Options** from the **View** menu (or **Tools** menu in WinXP). Next, choose the **View** tab from the dialog box that displays on-screen. Here, you can select the **Show All Files** option, click **Apply**, and click **OK**.

After deleting the `ShellIconCache` or `IconCache.db` icon cache files, close all windows and choose **Shut Down** from the **Start** menu. The next time you start your computer, your icons should be fixed.

■ Taskbar Troubles. Sometimes Taskbar icons, regardless of whether they're next to the **Start** menu or in the **System Tray**, bizarrely move, disappear, or acquire strange, new images. Sound-related software, instant messengers, hard drive maintenance tools, DVD players, video software, or specialized help systems from your computer's manufacturer can all garble your Taskbar.

If you use WinXP, make sure icons aren't hiding because of your Taskbar settings. Right-click the Taskbar and select **Properties**; on the Taskbar tab, deselect **Hide Inactive Icons**.

Every once in a while, the sound volume icon or some other Taskbar icon goes on vacation. Some quirky WinXP drivers require so much processing time to load during a boot that your PC forgets to display the Taskbar icons. Old drivers for Sound Blaster Live! cards are particularly troublesome, but WinXP's Classic Mode User Login could also be the problem.

Turning on the WinXP Welcome Screen might help. To enable the Welcome Screen, open the **Control Panel** from the **Start** menu,

select **User Accounts**, click **Change The Way Users Log On Or Off**, and click the checkbox next to **Use The Welcome Screen**. If the Taskbar icons are still missing, wait 15 seconds after the Welcome Screen first appears before logging in. The extra time helps the drivers load completely so your computer can focus on other tasks (such as your Taskbar) during login.

If you use Outlook or Outlook Express and start reading incoming e-mail before all of the messages completely download, the e-mail icon in the Taskbar won't go away. You can work around this program bug by closing Outlook and launching it again. Other-wise, just wait until all your e-mail is in before you start reading it.

You can usually solve other Taskbar troubles by updating to the most recent version of the program associated with the temperamental icon. For example, downloading and installing new drivers from the Web site of your sound card manufacturer often restores a disappearing sound volume icon. Also, use Windows Update to keep up with the latest Microsoft patches. If an icon absolutely doesn't stay in your Taskbar, you could always create a Desktop shortcut for it.

■ Legible Labels. A less serious problem arises when your Desktop icons have enormously long labels. The icons look fine, but the text below them might end abruptly with ellipsis before you can figure out what the entire label says and what the icon is represents.

The simplest solution is to shorten the name. For example, right-click the icon label, choose **Rename**, and change "Shortcut to My Shared Music Files" to "Shared Music" to save space. The shortcut still points to the same place.

Another solution is to give your Desktop icons enough room so you can see more of their labels. To increase icon spacing, right-click your Desktop, select **Properties**, choose the **Appearance** tab, and click **Advanced**; from the **Item** drop-down menu, choose **Icon Spacing**. If you increase the horizontal and vertical icon spacing from the 43 x 43 pixel default, you'll be able to see more characters within the icon labels.

■ Icon-O-Blast. Using the tips from this article, you'll have icon mastery over your Desktop and Taskbar instead of an icon mystery. **15**

by Andrew Kuster

The Confused Desktop

Make Adjustments To Your Background Image

One of the easiest, most effective ways to make your mark on your Windows Desktop is to customize the background. By using photos, Web pages, or other images as your Desktop wallpaper, you can create a unique appearance. But sometimes it takes a little more work than simply right-clicking a graphic and selecting Set As Background (or Wallpaper).

For example, you may have an image file as your wallpaper, but let's assume that one day the file becomes corrupt and simply doesn't appear when you boot up. The first thing you should do is make sure your system is still pointing to the designated file. To do so, right-click anywhere on the Desktop and select Properties from the pop-up menu. This summons the Display Properties dialog box.

Depending on which version of Windows you are using, you'll need to click a tab labeled Background or Desktop. Locate the list of available image files toward the bottom of the tab and see if the desired file is listed. If it is, highlight it and click Apply. If not, select the Browse button to dig through your hard drive folders until you find it. Next, click the image file to add it to the list, highlight it in the list, and click Apply. If that didn't do the trick, it's possible that you'll need to resave the image file from its original source or save it in a different format.

■ Active Desktop. If the graphic you're trying to display is a JPEG (Joint Photographic Experts Group) file, you may encounter an error message if Active Desktop is turned off. One way to solve the problem is—you guessed it—to turn Active Desktop on. And depending on your OS (operating system), an attempt to save a JPEG file as wallpaper may generate an error

message that prompts you to turn on Active Desktop by clicking Yes.

Or, if you're running Windows Me, you can use some JPEG images for your background without turning on Active Desktop. WinMe includes a number of sample JPEG files. Because Active Desktop requires more memory to display these images than the default WinMe can handle, you must adapt these images to use them as background images.

Microsoft suggests that you open the Start menu, select Documents, and then click My Pictures. Right-click a sample image, click Open With, Paint, and OK. From the File menu, click Save As. In the resulting window, choose one of the bit map (BMP) options, type a name in the File Name field, and click Save. Close the Paint window. Now, right-click the Desktop, select Properties, choose the Background tab, click the sample image that you saved as a BMP file, and click OK.

Having Active Desktop running may let you save other types of images so that you can see them on the wallpaper rather than saving them as file icons. For instance, if you have the Windows Desktop Update installed, and you try to drag an image from a Web page onto the Desktop, you may receive a prompt that states: "Do you want to add a Desktop item to your Active Desktop?" Clicking Yes activates the Subscription Wizard. When you finish following the wizard's instructions, the image will appear as an Active Desktop item. If you want it to show up as a file icon instead, you'll need to manually save the image by right-clicking it, choosing Save Picture As from the pop-up menu, and double-clicking your Desktop folder to save it there.



■ Final Tweaks. Once you have the desired image set as your wallpaper, it still may need some tweaking. Once again, return to the Display Properties dialog box to change the settings as needed to stretch an image to fill the screen, center it on the Desktop, or otherwise manipulate it. Use the Display or Position (depends on the OS) drop-down menu in the bottom right-hand corner to choose: Stretch, Center, and Tile.

Stretch stretches the image so it displays across the entire background, Center places one picture right in the center of the Desktop, and Tile creates multiple copies of the image so they cascade along the Desktop. Choose one option and click Apply.

If the image's colors are off or the resolution seems out of whack, you can try to fix the problem by adjusting other features via the Display Properties dialog box and its Settings tab. Be sure to consider the limitations of your video card when making these adjustments. For example, your video card will need at least 4MB of video memory if you want to use a resolution setting of 1,024 x 768 or greater.

Also, if you change the resolution but don't notice a change in your wallpaper appearance, it might be because you need to restart your computer.

Experiment with the screen resolution and color quality until your Desktop feels (and looks) like home. [E]

by Heidi V. Anderson



If your Desktop wallpaper needs some adjustments, use the settings in the Display Properties dialog box.

System Slowdowns

Why Is My System Sluggish?



Do you recall a time when your computer booted up in a flash? When windows snapped to attention the very nanosecond you double-clicked them? When programs and files loaded up seconds after you called them and without thrashing your hard drive into submission for a good minute? No, it isn't your imagination. That fully decked, megahertz screamer of a PC you bought six months ago really is slower than it used to be.

System slowdowns are a natural part of PC ownership, a speed bump that jostles everyone's ride at some point. In fact, let's give it a name: S4 (Sudden System Sluggishness Syndrome). The causes of this widespread affliction are many: fragmentation of your hard drive and a buildup of temporary or irrelevant files, more and more software loading itself into memory at startup and choking system resources, system settings that get

changed by new software and hardware installations, conflicting drivers. The list goes on and on because just about any addition to your PC, be it software, a hardware add-on, or just newly created files, can cause or aggravate system slowdowns.

So let's take it by the numbers, shall we? We'll review the major choke points on your PC, the most common places where S4 bacteria can fester, and the easiest ways to disinfect your PC. Unless noted, all of these remedies apply to both Windows Me and Windows XP.

■ Cut Through Ugly Hard Drive Buildup.

Simply because it involves moving parts, your hard drive is already one of the slowest components on your PC. As new programs and files accumulate on your system, the drive must work harder and longer to find and load them. Your best defense is to clean and defrag-

ment that hard drive on a regular basis. This involves several steps.

Use Windows' own Disk Cleanup program. In the Programs or All Programs menu, go to Accessories, System Tools, and Disk Cleanup. Designate which drive you want analyzed, click OK and the program will itemize all of the temporary Internet and system files, files in the Recycle Bin, and others that have built up over time and the amount of space being wasted on them. Clicking on each item will give a more detailed description of each file type, but generally it is safe to check all of the boxes in this menu and then click OK to have Windows clean them out.

Manually clean out temporary files. For some reason known only to Microsoft, the Disk Cleanup utility doesn't clean out the temporary files in the `WINDOWS\TEMP` subdirectory. Go to that directory and press `CTRL-A` to highlight all of the files and subdirectories in this directory. At the Edit menu, or by right-clicking the highlighted files, press the `SHIFT` key while you press the `DELETE` key. This ensures that the files will actually be deleted, not simply moved to the Recycle Bin. In many cases, Windows will not let you delete every one of the files in the `TEMP` subdirectory because some may be in use. Take note of the file names it refuses to delete and then work around them, deleting all the remaining files and subdirectories in the `TEMP` folder.

Uninstall unnecessary programs. Face it. There are tons of downloads and programs you have loaded onto your PC and never used. These are just gumming up the works, so from the Start menu go to Settings, then Control Panel, and call up the Add/Remove Programs utility. Highlight and uninstall only those programs you can identify and know you don't need. (NOTE: In WinXP, you can access the Control Panel directly from an icon on your Start menu.)

Defragment. Hard drive fragmentation occurs naturally as you use your PC, but it can be the most common cause of system sluggishness. Once you have eliminated all unused and temporary files from your system, it is time to call up the Windows Disk Defragmenter. Click Start, Accessories, then System Tools. The next window will ask you to designate which drive to defragment. Click Settings; in the next window check the options for rearranging your program files and checking the hard drive. This will relocate frequently used programs and system files onto the fastest areas of your hard drive surface, which can noticeably speed

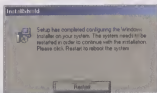
up ordinary Windows operations. Click OK on this menu and then OK on the main menu to start the defrag process. This can take hours, so schedule a defrag session for a time when you can leave the PC alone for an hour or more.

■ **Memory Bandits.** The second most common speed bump in Windows performance is caused by cluttered system memory. As less system memory is available to Windows, the OS (operating system) must start swapping programs in and out of virtual memory, areas of your hard drive that the OS treats as if it were memory. The biggest sources of memory theft are the utilities, system monitors, and programs that many hardware or software add-ons love to load whenever Windows starts. Some of these culprits can be seen as icons on your taskbar, but many are invisible unless you know where to look.

Use the System Configuration Utility to help clean up. From the Start menu, select Run. Type msconfig and then press ENTER to load the System Configuration Utility. Select the Startup tab. All of the checked items in this window are programs that Windows loads into memory whenever it boots. Unchecking any item will prevent it from loading next time you boot, but you need to be very careful about what you disable here. Programs like Pointer, Scan Registry, System Tray, and Power Profile may be critical to maintaining the OS's basic monitoring and safety procedures. Uncheck only those programs that you can identify as unnecessary. The Command column on this screen tells you where the program is located on your hard drive.

For safety's sake, we suggest that you focus on programs that your audio or video card may be loading from their program subdirectories or that media players, game controllers, and instant messaging clients are putting into your taskbar at startup. Microsoft Office, RealNetworks' RealOne media player, and America Online all place quick startup routines into the Taskbar when they're installed onto your system, yet most users don't really need them.

Once you finish unchecking any programs in the System Configuration Utility, click OK, and you'll be prompted to reboot your system in order for the changes to take effect. When you reboot, a pop-up window will ask you to con-



Literally hundreds of megabytes of temporary files can build up on your system, slowing down the hard drive. Use Windows' Disk Cleanup utility to keep the decks clean.

firm that you have made changes manually to your startup routines, and it offers a checkbox that will prevent the confirmation message from coming up every time you boot. If any of the changes you have made to your system are not to your liking, you can back out of most of them by going back into the utility and rechecking the boxes you unchecked earlier.

By eliminating unnecessary startup items, you'll help Windows boot faster and have more room to handle multiple programs without resorting to swapping to the hard drive.

■ **Crazy Drivers.** If your system seems to slow down after you swap in new system hardware, such as audio, video, or network adapters, then you may be suffering from driver overload. The drivers for the old hardware may still be loading into the OS. Even worse, they may actually be conflicting with the newer drivers. First, before upgrading to new audio or video cards, always fully uninstall the previous drivers. You still may be able to do this even if you have already installed the new add-on. Go to Start, Settings, and Control Panel. Select Add/Remove Programs and look for your old video or audio drivers. If they're present, uninstall them.

Out with the old, in with the new. In the case of video upgrades, you should always *uninstall* the previous version of the drivers and replace them with one of Microsoft's own default VGA or SVGA video drivers before installing a new card or even new drivers for the same graphics card. Again, even if you have upgraded a card without uninstalling the old drivers, this trick may help cleanse the OS of lingering drivers from the previous hardware. Go to Start, Settings, Control Panel, and Display. Click the Settings tab and then the Advanced button. Find the Adapter tab; you should see the name of your current video card at the top. Click the Change

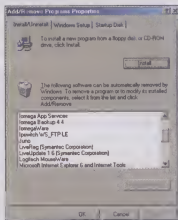
button and select the option for specifying the location of the driver. In the next box, check the box for showing all devices and look for a Microsoft video display driver labeled SVGA or Standard VGA. Highlight it and follow the prompts to load this "generic" driver and reboot the system. Windows should reboot at its lowest resolution and color depth, and from here you can either shut down and replace the old video card or load new drivers.

Too old to drive. Outdated OS and hardware drivers can bring your system to its knees because they may conflict with newer hardware and software on your system. For instance, current gaming software prefers to run under the most recent Windows DirectX drivers, the software that controls 3-D graphics, sound, and controllers in many games. The latest version is DirectX 8.1, which you can download from <http://microsoft.com/directx>. The upgrade will require a reboot of your system, but you may not be done quite yet. If you find you have trouble using certain graphics modes or if it takes a long, long time for some 3-D game sequences to load, then you should first try uninstalling and reinstalling your video card drivers or getting the latest version from the manufacturer's Web site.

Owners of AMD processor-based systems that use the VIA chipset have to be particularly vigilant about keeping their drivers current. VIA regularly updates a suite it calls 4-in-1 drivers, which helps video cards and disk drivers communicate more efficiently with Windows OSes. WinXP has VIA support built in, but earlier Windows versions may require one or more of

the drivers to work best. You can get the latest 4-in-1 drivers from <http://www.viahardware.com>. If your video seems sluggish on a VIA system, especially after a new installation of DirectX or new video card drivers, try uninstalling and reinstalling the AGP (Accelerated Graphics Port) driver from the VIA 4-in-1 suite. It often needs to be refreshed when you change other pieces of the video subsystem.

■ **OK, Who's Been Messin' With My PC?** Some hardware and software installations are

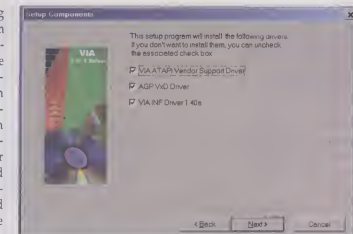


downright rude about changing Windows' system settings, and in some cases this can affect performance. Chief among them is the DMA (Direct Memory Access) setting for disk drives. When enabled, DMA assists the processing of hard drive information across the PC's data bus and considerably reduces the load on your processor. Driver updates and even some media-playing software can turn the setting off and degrade performance. To ensure that it's engaged, go to the System Properties menu in the Control Panel and select the Device Manager tab. (In WinXP the first need to call up the System Properties folder from the Control Panel and then go to the Hardware tab. Click the Device Manager button.)

Enable DMA. Under both the CD-ROM and Disk Drives entries, right-click on each installed device to call up its Properties list. Go to the Settings tab and look for a checkbox labeled DMA; if it's off, toggle it on. (This will require a reboot to take effect.) While you're in the Properties list for your CD-ROM drive, also look for the Auto Insert Notification checkbox. This tells Windows to launch a newly inserted CD-ROM disc automatically when it is inserted in the drive. Some software programs will toggle this option on, but many users find it bothersome. If you can live without the option, turn it off.

(NOTE: Setting DMA in WinXP requires right-clicking on Primary and Secondary IDE Channels under IDE/ATAPI Controllers in the Device Manager. Under the Advanced Settings tab and Transfer Mode menu item, you will want DMA If Available showing in both the Device 0 and Device 1 boxes.)

Disable unused drivers. A new hardware upgrade may have added more devices to your system than you counted on or need. For instance, some newer audio and multimedia video cards have extra IEEE 1394 (often called FireWire) ports for connecting to digital video devices or to a network.



Owners of AMD-based systems that use the VIA chipset need to keep up with VIA's 4-in-1 driver set in order to keep their hardware running efficiently, especially with Windows 98 and Me.

Audio cards often add a driver and reserve resources for DOS game sound support. Even if these devices go unused, they require that Windows load drivers for them at boot up and monitor them for activity; these background operations can slow down your system or even introduce resource conflicts. In the same hardware Device Manager menu we used above you can disable this unused hardware. Right-click the device and call up its Properties list. Under the General tab, check the box at bottom to Disable In This Hardware Profile, and reboot. This will prevent Windows from devoting resources to

the device. In WinXP the same option is available, but it is on a drop-down menu.

■ **Professional Strength Windows Cleaning: The Fresh Install.** A drastic but altogether viable alternative to cleaning your system is to start over. No, we don't mean that you should buy a new machine. But reformatting your hard drive and reinstalling Windows is the surest way to restore a PC to its original speed and luster. It lets you start fresh, without ugly driver and hard drive buildup. In fact, for many of us who review hardware and software for a living, it is a necessary routine every six months or so.

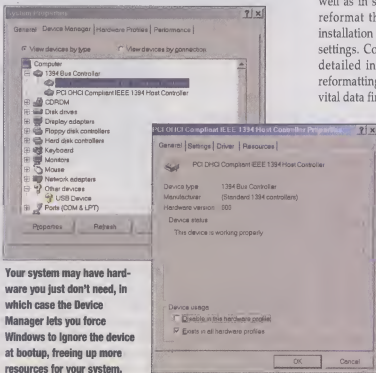
One reason for system sluggishness is a recently upgraded OS. Both WinMe and WinXP upgrade packages give users the option of installing the new OS version over the old version or using a newly formatted drive or partition. We recommend the latter, especially when upgrading to WinXP. A fresh install is faster and less prone to crashes.

Yes, it's best to reformat. By the way, many people think that deleting the Windows directory on your hard drive and reinstalling Windows is good enough, but because old system files and settings still reside in the hard drive's root directory as well as in subdirectories, you really need to reformat the hard drive to ensure a clean installation that does not carry over any old settings. Consult your Windows manual for detailed instructions and warnings about reformatting a drive. In general, back up all vital data first, including your Web browser's

favorites and all messages, contacts, and calendars from your e-mail client. Don't forget to record any vital passwords you use for Web sites and your network settings.

A format and a reinstall may seem like drastic measures, but the fact of the matter is that S4 is an inevitable blight for any PC, and overcoming it sometimes requires a clean slate. **[S]**

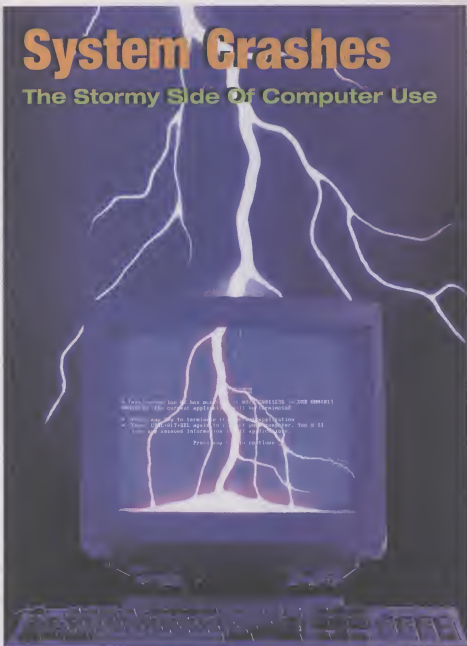
by Steve Smith



Your system may have hardware you just don't need, in which case the Device Manager lets you force Windows to ignore the device at bootup, freeing up more resources for your system.

System Crashes

The Stormy Side Of Computer Use



For most people, using a computer is a lot like driving in a fog. You may understand how the vehicle works (in general terms, anyway), and you may know the rules of the road, but if you can't see exactly what you're heading into, then there's a good chance you'll end up in an unexpected crash.

■ **A Crash Course.** A crash, in computer terms, is the sudden termination of a program or the OS (operating system). A crash can manifest itself through an error message or by **locking up** (a condition in which the Desktop or a program window freezes and does not respond to mouse clicks or keyboard commands) the computer. A crash also may cause

an application or the computer to shut down without any warning at all. In any case, a crash will bring at least one of your open programs to an immediate halt.

Generally speaking, crashes are the result of system instability, and system instability can occur for any number of reasons. Program bugs and corrupt files can cause your software to flare up. Certain malfunctions and outdated device drivers can make your hardware components go haywire. Viruses and user-inflicted errors, such as accidentally unplugging a peripheral while it is running, will shake your system down to its foundation.

Although determining the specific cause of each crash is certainly a vital part of the

troubleshooting process, it is equally important that you pay attention to the circumstances in which the crash occurred so that you can figure out why the cause existed. For example, knowing that a particular VxD (virtual device driver; a program that handles communication between several applications and a hardware component) file sparked a fatal exception error can help you recover from a crash, but it can't tell you why the file went bad in the first place. You must take time to consider the "whys" as well as the "whats" when troubleshooting your PC.

Toward that end, we have identified several situations that are prone to cause system instability and may ultimately result in a crash. As you can see, most of the causes can be traced to software-related issues.

Situation 1. Doing too much at once. Have you ever noticed that most of the electronic components and major appliances found in your home or office are dedicated to performing a single purpose? A refrigerator keeps your food cold, for instance, while a vacuum cleaner sucks dirt off the floor. The biggest exception to this rule, of course, is the personal computer. Once used primarily for computing, today's computers have evolved into organizational hubs, communication bases, entertainment centers, financial marketplaces, and digital imaging studios. With so much to do and so much to keep track of, is it any wonder that these technological marvels experience a little trouble once in a while?

Considered within this context, you can begin to see how a crash could happen. Just one flub in one file can bring your finely tuned system to a grinding halt. And the chances for a flub are increased greatly when you put your system under undue stress, says Jake Parker, a case management supervisor at Compaq.

"Your system can be stable, but if you open up too much, it overloads the system," he says. "I understand these computers are powerful. But it doesn't matter what brand you have, it's still one processor trying to handle all these applications."

What happens if you overload the system? In addition to labored performance and interrupted downloads, you can expect to see programs lock up and all sorts of crashes, including system crashes (crashes that affect the OS, and therefore, affect the entire computer) and application crashes (crashes that affect a single application or several applications but do not affect the OS). Among the error messages you may see as a result of overtaxing your computer are

fatal exception errors (system errors that occur when the OS attempts to perform an invalid action), **general protection faults** (application errors that occur when the application attempts an invalid action or comes into conflict with the OS), and **invalid page faults** (errors that occur when the OS or an application attempts to access data that is corrupt, nonexistent, or in use by another program).

To avoid such disasters, Parker says users must learn which activities put stress on their systems and run these activities separately. For example, rather than try to download MP3 files

System Stressors

Overstressing your system is one way to trigger crashes, error messages, and freezes. Although you can multitask safely with less-demanding activities, you should avoid running two or more demanding activities simultaneously. The following lists include examples of activities that stretch system resources and those that do not.

PC Activities That Can Stress Your System

- large file downloads
- large printing jobs
- burning data to a CD-R (CD-recordable)
- graphics editing
- video recording and editing
- audio recording and editing
- digital scanning
- video playback

PC Activities That Don't Stress Your System

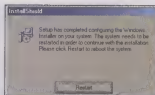
- word processing
- e-mail messaging
- Web surfing
- recording financial transactions
- accessing an address book
- audio playback
- entering data in a spreadsheet

and **burn** (record data to) CD-Rs (CD-recordables) at the same time, you should download the files first and burn the CDs later. This helps all system resources focus on doing a single task well. Limit multitasking to applications that do not place a great demand on system resources, such as word processors and e-mail programs.

Tip 2: Installing several programs simultaneously. Any time you install a new peripheral to your system, you run the risk of system instability. Sometimes hardware can be incompatible with your computer. To minimize this risk, you should add new parts to your system one at a time, giving each the chance to become part of your system without anything else.

Unfortunately, too many users ignore this advice and attempt to install several programs or devices in one session without restarting the computer between each installation. The result is a smorgasbord of application crashes, system crashes, and all sorts of error messages. Why? For one thing, most software and hardware installations require at least one system reboot to complete the installation. Skipping this reboot essentially leaves the installation only half complete. To install a second program or component while the first installation remains undone is to invite a variety of data errors due to missing and damaged files.

Even if you remember to reboot the computer between installations, mass installations are likely to result in big problems because they don't give you the chance to examine the program thoroughly while it is still fresh on your system. This is the best time to identify bugs, sort out conflicts with the OS or other system components, and install patches (a piece of code designed to fix a bug) and product updates. It is also the best

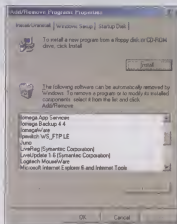


You must reboot your computer after most software and hardware installations. Ignoring this crucial step so that you can install another program or peripheral is a risky decision that could come back to haunt you later.

that appears to affect only one program actually may be the result of an error with a Windows system file. Similarly, a fatal exception error that seems to implicate your OS as the source of trouble may be masking a series of problems that start with a conflict between an application and a piece of hardware. Your only recourse in such a situation is to uninstall everything and begin again.

Situation 3: Neglecting the installation. Besides installing programs and peripherals one at a time, you also need to pay strict attention to every step involved in the addition of each new program or peripheral to your PC. Otherwise, you will miss a chance to eliminate some potential threats to system stability.

For example, many of the applications and utilities you install are designed to load as the most important piece of software on your system. As a result, you end up with shortcuts on the Start menu, the Desktop, the Taskbar, the System Tray, and anywhere else that can accommodate icons. Even worse, the programs may add lines of code to your startup files that tell the OS to launch the programs automatically every time Windows boots up. You may not know that these programs are open in the background on your system, but there they are, and they're sucking resources and threatening to interfere with the other applications you need to use. To prevent this from happening, you should not let your software installations load files into the computer's Startup folder.



An abundance of software can lead to system instability. The Add/Remove Programs utility, which is accessible through the Windows Control Panel, can help you uninstall unwanted software. Use it to minimize the likelihood of crashes and error messages.

(For more information about this, see "Unload The Overload" on page 118 in this issue.)

Similarly, many programs use common files, such as **device drivers** (software that lets a hardware component communicate with the rest of the system) and **DLL** (dynamic-link library) files. During an installation, you may receive a message asking whether you want to replace one of these common files. Blindly choosing the Yes response could result in a fatal exception error, the **Blue Screen Of Death** (term describing the situation in which a computer locks up and its screen turns blue, sometimes abbreviated as **BSOD**), or an application crash whenever you try to access a program that depends on this common file. Blindly choosing the No response could have the same results. Your best bet is to take note of the file for future reference and then choose to use whichever version of the common file is dated most recently.

You also should review the Readme file to learn of any known problems with the program, including bugs or incompatibilities with hardware and software you own. Identifying situations that may lead to crashes is an excellent way to avoid them.

Situation 4: Installing too much software. Personal computers have become a mainstay of modern life because they can accommodate an abundance of software. Unfortunately, an abundance of software also may lead to system instability and crashes, says Howard Locker, chief architect for client systems at IBM.

"As you mix lots of software together, you get applications that overwrite each other and DLLs that overwrite each other," Locker says. "A lot of Web sites push (applications) on you, too, so that's a big problem. . . . After awhile, the system begins to deteriorate on you and you see lots of crashes."

The fact is that all of the software—the OS, the device drivers, the productivity applications, the games, the Web browsers, the e-mail clients, the shareware utilities, the browser plug-ins (add-on programs that enhance browser functionality), and any other piece of code—that goes into a system must function together as a unit. With so much software out there, however, conflicts are bound to arise. So, as a result, you get fatal exception errors, invalid page faults, application crashes, system crashes, and Blue Screens Of Death. Essentially, you get an unstable system that becomes weaker with the addition of each new program.

The answer, of course, is to limit the number of applications you install on your PC. Be

Potential Conflicts Due To Known Windows XP Incompatibilities

Users who decide to upgrade to Windows XP from Windows Me or Windows 98 are in for an unpleasant surprise. Namely, they will find that some of their applications and utilities do not work with Microsoft's latest OS (operating system). Why? Because WinXP is fundamentally different from its consumer-oriented predecessors. It is based on the Windows NT kernel (module of code that forms the core of the OS), whereas Win98 and WinMe are based on the Win9x kernel.

That may not sound like a big deal, but it is. Think of the difference between a furnace that runs on natural gas and one that runs on coal. Both provide adequate heat for your home, but you cannot run the one with fuel from the other. So it is with OSes. WinXP and WinMe both provide intuitive interfaces for accessing your files and programs, but the underlying code that controls the performance of each is vastly different. As a result, many of the programs that worked so well with WinMe or Windows 98 do not work so well with WinXP.

For example, the PlayCenter software that accompanies the Sound Blaster Live! sound card is not compatible with WinXP. If you try to run the software after upgrading to

WinXP, you may receive an error message that states: "This supports your hardware but is incompatible with Windows XP." Similarly, trying to install your copy of Norton AntiVirus 2001 on WinXP will result in an error message that states: "Norton AntiVirus 2001 has a known compatibility issue with this version of Windows."

Unfortunately, not all compatibility conflicts come with such clear explanations. If after upgrading to WinXP, your computer suddenly locks up each time you try to access a specific program, then it's possible the culprit is a compatibility conflict. The same holds true if your computer crashes every time you open or close a particular application. Basically, any program that ran fine prior to a WinXP upgrade but began causing trouble after a WinXP upgrade is probably a victim of OS incompatibility.

The most common solution to this problem is to remove the offending application and replace it with a version that supports WinXP. In many cases, you will have to pay for the upgrade. Users of Norton Ghost 2001 and Symantec WinFax PRO 10, for instance, must pay \$50 per program to get a WinXP-compliant version of the product. If you're lucky, as are users of QuickTime 5

and McAfee VirusScan 4.5, you can get free downloadable updates by contacting the software developer or checking with Windows Updates (<http://windows.update.microsoft.com>).

Rather than deal with the hassle of updates, though, we recommend you look for potential compatibility problems before upgrading to WinXP. Microsoft offers a pair of tools just for this purpose. The tools include a Windows Catalog, which presents a searchable list of software that is known to be compatible with WinXP; and the Upgrade Advisor, which is a downloadable utility that scans your system, identifies potential conflicts, and installs any free updates that you need. To access these tools, users of WinXP Home should visit <http://www.microsoft.com/windowsxp/home/howtobuy> and users of WinXP Professional should visit <http://www.microsoft.com/windowsxp/pro/howtobuy>, both of which have the link, Make Sure Your Hardware And Software Are Compatible With Windows XP.

(NOTE: Although anyone can use the Windows Catalog, Upgrade Advisor is available only to users who have high-speed Internet connections and PCs that run Win98, WinMe, WinNT 4.0, or Windows 2000.) ■

selective about the programs you buy and download. Pass on freebies, plug-ins, and trial software that you really don't need. Uninstall old software and hardware that you no longer use. Ask yourself whether the potential benefit

provided by a certain product is worth the potential hassle of error messages, lockups, and crashes. In many cases, it probably isn't.

That's not to say you should abandon software altogether. "There's always a trade-off

The Blue Screen Of Death

The Blue Screen of Death (or BSOD for short) sounds much worse than it really is. Essentially, it's an error message that appears as white text on a blue screen. It earned its notorious nickname because it typically signals a system crash that requires a reboot.

The first thing to do when you see a BSOD is note the error message. Next, press any key on the keyboard. Doing so

might banish the BSOD and let you return to the Desktop, where you can save your data and close your open programs. Finally, you need to reboot (restart) the PC. Use the Start menu's Shut Down command if you can. Otherwise, press the CTRL-ALT-DELETE key combination to reboot.

Now it's time to figure out why you received the BSOD. Start by heading to the Microsoft Knowledge

Base (<http://support.microsoft.com/default.aspx>). There, you can search the Windows support documents for an answer to your particular BSOD. If that doesn't work, you may need to update an outdated device driver, get a patch for buggy software, or replace an ailing component. Contact your computer manufacturer or Microsoft for assistance in resolving the issue. ■

between flexibility and function," Locker says. "You can lock-down your computer and you can prevent anything from changing. But then you have a closed system, and you can't take advantage of all the great things out there. I don't think that would be good for individuals."

Situation 5: Running pirated and prerelease software. On the same day Microsoft released Windows XP late last year, it also announced more than 18MB worth of updates for the product. If that's how many problems are known to exist in the retail version of one of the most visible software releases of 2001, just think of how many problems there are with prerelease software (software distributed for testing purposes prior to its public release) and pirated software (software obtained illegally). You can help ensure the stability of your system by avoiding such software.

What's wrong with prerelease and pirated software? Well, the former is distributed precisely because it is known to have problems. Seasoned computer users run the prerelease software through grueling routines in order to identify bugs, product incompatibilities, and other weaknesses. This information is compiled in a report and given to the software engineers, who then have a chance to fix the code before the product ships. You should run prerelease software only if you understand the risks involved (for example, you know general protection faults and application crashes are more likely to occur) and have enough technical competence to handle the resulting errors or crashes.

Pirated software, on the other hand, is problematic because you cannot verify it as authentic

(not to mention the fact that it's illegal). It may hide bugs, viruses, and damaged files, all of which can wreak havoc on your system. Worse yet, you cannot get legitimate technical assistance for pirated software because you do not own a license for it. Avoid pirated software by only using applications and utilities you purchase from a reputable retailer or download from a trustworthy Web site.

Situation 6: Letting viruses infect your system. The typical discussion about viruses (malicious code that infects a file or program and then replicates itself) these days tends to focus on the damage they can do to your data files and your network. It's important to remember that they also can damage system files, program files, device drivers, and the Registry (a database of system settings and user preferences in Windows). When those files become corrupt, system instability ensues. You could end up with fatal exception errors, general protection faults, system crashes, application crashes, the Blue Screen Of Death, and even the inability to boot your computer.

Antivirus software can protect your computer system from viruses, worms

(self-replicating code that does not require a host), Trojan horses (programs that appear to be something other than what they really are), and other types of harmful code. Some of the most popular antivirus programs include Norton AntiVirus (\$49.95; <http://www.symantec.com>), McAfee VirusScan (\$49.95; <http://www.mcafee.com>), and Command AntiVirus (\$24.95; <http://www.commandcom.com>). To keep the software effective, you must update it regularly—we suggest once per week—and purchase update subscriptions every year.

■ **The First Response.** Regardless of the cause, you must respond when a crash occurs. The first response is to save your unsaved data if you can, and then shut down the computer completely. You should use the Shut Down command on the Start menu or press the CTRL-ALT-DELETE key combination to access the Close Programs dialog box and use its Shut Down command instead.

If these options are not available to you because the OS locked up, press and hold the computer's power button until the system shuts down. In any case, let the computer cool down for 10 seconds or so, and then restart it. This is called a **cold boot**, and even though it may not be necessary, it will give your computer the chance to recover from

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Viruses are a sure-fire source of crashes and errors. Use an antivirus utility, such as Command AntiVirus, to protect your computer system from malicious code.

its traumatic experience before it starts working again.

After recovering from the crash, it's time to evaluate what went wrong and how you can prevent a crash from happening again. First, take note of what you were doing on your system immediately before the crash: which applications were open, what functions you were trying to perform within each application, and what hardware peripherals were involved. Ask yourself whether you've ever run the computer under similar circumstances and what happened in those instances. Think about recent changes you made to your computer.

Next, try to determine where the problem occurred. For example: Did the freeze only affect one application or did the entire

system lock up? This will determine whether you should look for fixes that pertain to a specific program or to the OS. Note that some problems that appear to be limited to one application may actually have roots deep in the OS, and vice versa. To clarify the issue, take note of the specific files involved and copy the text (verbatim) of any error messages that appear on-screen.

Finally, look for a solution to the problem so that you can avoid it in the future. Visit the Microsoft Knowledge Base (<http://support.microsoft.com/default.aspx>) online to look up error messages related to the Windows OS. If another application is involved, access the developer's site and review its support content for a fix. Hardware issues can be resolved by updating

device drivers (you'll find them at the hardware manufacturer's site).

To further ensure that the crash or error message does not happen again, you may need to uninstall problematic or extraneous applications, scan your system for viruses, and tone down your aggressive computing habits.

■ **Get Out Of The Situation.** Avoiding crashes is really just a matter of avoiding the situations that lead to crashes. Take the time to learn about your computer, think about the way you use it, and learn to recognize the signs that trouble might be on its way. You'll be computing crash-free before you know it. [E]

by Jeff Dada

Remote Assistance: A New Way To Get Help

When your car starts making funny grinding noises, you drive it to a mechanic. When your washing machine leaves a pool of water on the floor, you call in a trained technician. When the images on your TV begin to look blurry, you visit the repair shop. This is how you deal with most technical problems, so why in the world do you try to resolve computer problems with a phone call or e-mail message?

Historically, the answer to that question is simple: You have no alternative. Computer manufacturers and software developers cannot afford to send technicians to fix every glitch-ridden PC, and users are reluctant to pay hard-earned money to repair buggy software and malfunctioning hardware. Under these circumstances, telephone and e-mail technical support have proven themselves to be the most cost-effective solutions for all parties involved. That situation may change, however, with the release of Windows XP and its new Remote Assistance functionality.

Microsoft designed Remote Assistance to facilitate the

process of resolving technical issues. The feature lets support technicians tap into your PC using an active Internet or network connection. Once they achieve access, the technicians can take control of the system and fix problems directly rather than waste time walking you through the inefficient steps of troubleshooting problems remotely. All you have to do is invite the technician, who can be any other WinXP user, to access your PC.

To issue an invitation, open the Start menu, click the All Programs button, and select Remote Assistance from the program menu. The Help And Support Center dialog box will appear on-screen. After you click the Invite Someone To Help You option, you will be asked to enter the e-mail address of the technician who will be helping you. You also must type a brief message describing your problem, set a time limit for the technician to respond to your request for help, and specify a password that the technician can use to verify his identity to your system. Finally,

you need to send the invitation by e-mail to the technician.

All that remains is for you to leave your computer turned on and connected to the network until the technician responds. Once that happens, the technician can log into your system and address the issue. After solving the problem, the technician closes the connection and your computer is back in business.

Remote Assistance can be a valuable ally in the quest for quick and effective technical support. Unfortunately, it has a couple of significant drawbacks. First, Remote Assistance works best over high-speed network connections. Dial-up users may experience delays when they use the feature. Second, your pool of supporters is limited to those who have WinXP-based PCs. The utility is useless if you're requesting assistance from your nerdy cousin who uses Linux or an IT administrator who uses Windows 2000.

Most significantly, any technology that lets someone else access your PC must be seen as a potential security threat. The

good news is that Microsoft has taken measures, including password protection and time expiration, as we mentioned previously, to minimize the risk. You can further secure your system by watching your computer screen while the remote technician works on it. If you see the individual get into a folder or settings that you consider off-limits, you can close the network connection and cancel the support session.

We suggest adding Remote Assistance to your arsenal of troubleshooting weapons. You can use it with your friends and relatives, your network administrator, and even professional support technicians (Gateway and eMachines are among the companies that have announced their intention to use Remote Assistance as a support option). All you have to do is ask if potential technicians have WinXP and if they would be willing to use the utility to resolve your problem. Because Remote Assistance makes troubleshooting so easy, odds are the answer will be yes. ■

The Hot Button

Methods For Recovering Deleted Files



Maybe you just clicked the wrong e-mail attachment and gasped in horror as a virus eviscerated the data on your hard drive; maybe you right-clicked a file and accidentally selected Delete from the pop-up menu instead of Rename; maybe Mr. McJimbles the iguana figured out how to use a keyboard while you were at the store. Whatever it was, the point is: You can't find a deleted file and you need it back. We can help.

Fortunately for you, the Windows Recycle Bin makes it difficult to inadvertently destroy something important. Usually, whenever you delete a file from your hard drive, Windows marks it as deleted on the hard drive and stores its file name in the Recycle Bin so you can easily restore it. Simply double-click the Recycle Bin icon on your Desktop, right-click the file you want, and click Restore from the pop-up menu.

But what if something slips through the cracks? Calm down . . . even if your file is really gone and you can't find a copy of it

anywhere on your computer, the day may yet be salvageable.

How is it possible to recover a truly deleted file? To understand this magic, you need to know something about how Windows stores data on your hard drive. At the lowest level, of course, the smallest piece of information stored by a computer is a bit—a 1 or 0. Eight of these combined make up a byte, each of which is identified by a unique address, a number marking its location in memory. When you save a Microsoft Word document, such as *ShawarmaSandwich.doc*, to your hard drive, the OS (operating system) peruses the FAT (file allocation table; sector of hard drive that indexes file names and addresses) to find the location of the most convenient batch of unused space on your drive so it can copy the file there, updating the FAT accordingly. When you need to access *ShawarmaSandwich.doc* later, the OS just cranks through the FAT to find the address and skips merrily over to retrieve it.

What happens when Mr. McJimbles deletes *ShawarmaSandwich.doc*? Well, the entry gets erased from the FAT and the address gets flagged as free space that's ready for the next save operation. The crucial point to recognize about the process is that deleting is *not* erasing; at no time did the OS actually remove your bits from the hard drive by changing them all to 0s or scrambling them (unless you installed security software designed to perform such feats). This means that with the right tools you can find your file again and bring it back from the dead, unless it's been gone so long that the OS wrote something over it, in which case you can go ahead and give yourself that dose of extra-strength aspirin.

■ **Steps Of Desperation.** So, what's your plan of action when disaster strikes? We've outlined some steps for you to follow.

Check the Recycle Bin first. The Recycle Bin is the frequent deleter's best buddy. Although most of the things you delete will head there first, be aware of a few caveats: If your Bin is full and you don't empty it, Windows will stop keeping copies of all your deleted files. The same is true if you delete a file that's too big for the remaining space in the Recycle Bin. Also, files don't end up in the Bin if you delete them from a mapped network drive, from a floppy diskette, within certain applications such as Windows Explorer, or at a DOS command prompt. If you like a lot of trash in your Bin, you can adjust the maximum size of hard drive space it occupies by right-clicking the Recycle Bin icon, choosing Properties, and changing the slider accordingly.

What did you say? There's no *ShawarmaSandwich.doc* in the Bin? Move on to the next step.

Restore the file from a backup copy. What do you mean there's no backup copy? You spent days drafting *ShawarmaSandwich.doc*! You know you're supposed to regularly back up your system data, or at the very least, save important files on some type of removable media, such as a Zip disk, CD-RW (CD-rewritable), etc. Slap yourself and move on to the next step.

Don't save anything else yet. Having exhausted the easy fixes, we are now wading in more treacherous waters. At this point, any data you save to the drive containing your languishing file might be saved directly on top of it, resulting in a permanent loss. This means you should close or stop using any programs that save files automatically every few minutes

or so (such as word processors), but don't close programs that save files upon exiting.

Use commercial undelete or restoration software. Windows hasn't come with an undelete utility since version 3.1, but, thankfully, numerous third-party vendors cater to the careless. Their products will scan your hard drive for all the files and folders currently there (including deleted ones) and let you select a file or folder you want to restore.

There is a little wrinkle associated with using such software: If you don't already have it on your system, you can't install it on the drive where your deleted file was saved or you risk overwriting it. If you have two drives, put the software on the other one; otherwise run it from a diskette or CD. But this method isn't foolproof, either. Why? Because a system with insufficient RAM must utilize a swap file on the hard drive, so therefore, it might still overwrite your deleted file (but it's at least a somewhat safer alternative). Likewise, when using the software to restore files, you don't want to save them to a folder on the same drive and risk overwriting the sought-after deleted file.

You can also consider using a file recovery program to create an image file, particularly if it looks like your hard drive might be corrupt or damaged. An image file is a precise snapshot of your hard drive or a portion thereof. Basically, an image file copy operation completely ignores the nature of the data and mindlessly copies byte after byte to a new location. An undelete program treats the resulting file exactly like it's a hard drive, and it's in no danger of being overwritten. Of course, there is a catch: The image file is the same size as your hard drive, and for most of us, that's a whopper. If you don't have a second hard drive of equal capacity on which to save such an enormous file (or perhaps a DVD-RW [DVD-rewriteable]), then you have problems. If you're on a network, try to find a friend who is willing to make room.

When using file restoration software, you should also be aware that in some versions of Windows, the name of your file will change during the process of moving through the Recycle Bin, so don't panic if the file you want doesn't appear after a restoration. Files receive new names according to their format, such as: `dc00.doc` (substitute the drive letter for `c`, substitute a number for `00`, and substitute the file's

original extension for `.doc`). So, Shawarma-Sandwich.doc might now be called `dc3.doc` or `dd12.doc`, for example. Just wade through all the files with the correct extension.

Finding undelete and recovery programs on the Internet requires little more than a few keywords in your favorite search engine. We've listed a few worthy contenders here. Norton Utilities 2002 (\$49.95; http://www.symantec.com/nu/nu_9x) comes with an undelete feature that runs in DOS mode, drastically reducing the chance that you will inadvertently write over your data during

think you might overwrite your data, or if you think your drive is physically corrupt, a professional data recovery service might be worth considering. At the very least, a data recovery service can create an image file of your entire hard drive (which you can't do without the requisite storage space on another drive), and they probably have a lot more flexibility in their repair options than you do—not to mention expertise.

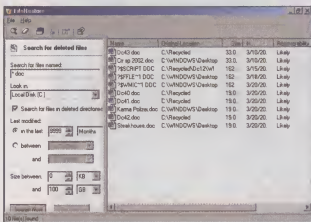
On the downside, this type of service can be quite expensive. So, before making any commitments to use a service, ask the technician for an estimate on cost and an estimate on his chances of recovering the file, but be aware that some data recovery companies charge a fee for a diagnostic evaluation (in addition to the cost of actually retrieving data). Then ask yourself whether the file in question is worth the cost.

To find this type of service, look in your local yellow pages or online. Some reputable companies in this industry include DriveSavers (<http://www.drivesavers.com>) and Drive Service Company (<http://www.driveservice.com>). If you must mail your hard drive to a recovery service company, follow its packing instructions. Some companies employ technicians who can recover your

files through an Internet connection. But if these guys can't get your data back, then it's time for the last step...

■ **Back To The Drawing Board.** Here it is, the final option nobody wants to think about: Start over. And even though your chances of a file recovery are actually pretty good if you start the process soon after the catastrophe, you really should have been preparing yourself mentally for this contingency from the very beginning. Now that it's here, take some deep breaths, close your eyes, and imagine a warm tropical beach with copies of your file bobbing up and down on the surf like buoys glinting in the sun; now watch them all getting swallowed by kelpy sea monsters shaped like Mr. McJimbles. Realize that this is a learning experience and an exercise in self-control. Then break something expensive and take the rest of the day off. [E]

by Ryan Turner



FileRestore from Winternals (shown here in its demo version) sports a Windows Explorer-like interface that makes it easy for new users to adapt to and quickly find deleted files.

the recovery operation. R-tools Technology (<http://www.r-tt.com>) offers several versions of its R-Studio (\$49.99 and up) with powerful functionality, including the ability to write image files and recover from damaged drives. R-tools Technology also offers the cheaper but more limited R-Undelete, which is also effective but not so user-friendly. Fast File Undelete from dtidata.com (\$29; <http://www.dtidata.com>) can even recover data from a formatted hard drive. And FileRestore from Winternals (\$39; <http://www.winternals.com>) has an extremely intuitive interface, modeled after Windows Explorer.

Most of these products offer free evaluation versions, but the demos usually let you see the deleted files but not recover them, or they'll permit you to restore only small files. So the only way to get any real use out of these programs is to pay for the full version. But hey, what's a little money in return for peace of mind?

Bring it to the pros. If you don't feel entirely comfortable running undelete software and

No Going Back

Make Sure The Bridge Provided By Backup & Restore Works Correctly



Since the release of Windows 98, Microsoft's OSes (operating systems) have included some type of backup function, ranging from a basic program for backing up and restoring data files to complex system restoration tools that let you return your PC to a previous working state. These tools can help you recover information lost due to system crashes, accidental erasure, hardware failure, and other problems, but only if you know how to use them and how to work around known quirks.

■ Install Backup Software. Using a backup program can back up files to floppy diskettes, Zip disks, tapes, and other removable media, as well as local and networked hard drives. It can also restore your files. For Win98 and Windows Me users, we'll explain how to use Microsoft

Backup; for Windows XP users, we'll provide instructions about using NT Backup.

Win98. Open the Start menu, select Settings, and click Control Panel. Double-click the Add/Remove Programs icon, and select the Windows Setup tab. On the list of available components, double-click System Tools. Select the checkbox next to Backup, and click OK. Click Apply, insert your Win98 CD-ROM, if requested, and follow the on-screen instructions.

WinMe. Insert the WinMe CD-ROM, click Run from the Start menu, and type `d:\addons\msbackup\msbexp.exe`

(Replace the letter *d* with the correct letter for your CD drive. Click OK to start the installation.)

WinXP Home. Insert the WinXP CD-ROM, click Run from the Start menu, and type `d:\valueadd\msft\ntbackup\ntbackup.msi`

(Replace the letter *d* with the correct letter for your CD drive. Click OK to start the installation.)

WinXP Professional. NT Backup automatically installs with WinXP Pro.

■ Use Microsoft Backup For Win98 & WinMe. The first time you use Microsoft Backup, you might receive a warning that no backup devices (such as tape drives) were found on your computer. If you have a dedicated backup device, click Yes to run the Add/Remove Hardware control panel and install the necessary drivers. Otherwise, click No.

Create a new backup. When you launch Backup (click Start, Programs, Accessories, and System Tools), a wizard guides you through the process of creating a backup, updating an existing backup, or restoring from a backup. To create a new backup, select Create A New Backup Job, and click OK. You can select My Computer, which backs up all files and folders on your computer, or you can select specific files, folders, or drives. For our example, select Back Up Selected Files, Folders, And Drives. Click Next.

A Windows Explorer-style window lets you choose the items you want to back up. Let's assume we're going to back up your My Documents folder. Click the plus sign (+) next to the C: drive icon to display the folders in the root directory of the C: drive. Click the My Documents folder to display its contents. Select the files or folders you want to back up by putting a check mark next to their names. To select all items, place a check mark next to the My Documents folder, and click Next.

Here, you need to choose whether to back up all selected files (a full backup) or just the files that have changed since the last time you performed this backup (an incremental backup). This is a new backup, so choose All Selected Files, and click Next.

Select a destination for the backup. If you're backing up to another hard drive or to removable media, select the File option from the drop-down menu, use the Browse button to locate the destination, and click Next. If you have a dedicated backup device, select it from the drop-down menu.

You can now set two optional parameters. Compare will compare the original files to the backup files to verify that the data is correct; Compress will compress the backup files to take up less space. Select both options and click Next. Give your backup a descriptive name, such as My Documents Backup, and click Start.

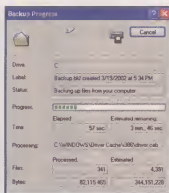
Microsoft Backup displays status information as the backup proceeds. When the operation is complete, click OK. Click Report to view a log file and a list of any errors that Backup encountered.

Additional options. You can use Microsoft Backup to save a copy of the Windows Registry (an internal record of your computer's configuration), which you should do with every backup. Because of a bug in the Backup program, you'll need to choose to back up the entire Windows directory (C:\WINDOWS). Select the Backup tab and click Options. In the dialog box that appears on-screen, select the Advanced tab, click the checkbox next to Back Up Windows Registry, and click OK.

■ **Use NT Backup For WinXP.** Open the Start menu and click All Programs, Accessories, System Tools, and Backup. If you have WinXP Professional, NT Backup should appear in your Start menu by default. If you have WinXP Home, you need to manually install NT Backup from the CD-ROM, but Microsoft doesn't support its installation. For more information, see the "Unsupported NT Backup For Windows XP Home Edition" sidebar.

NT Backup starts with the Backup Or Restore Wizard; click Next. Select the Back Up Files And Settings option, and click Next. The options are to back up your documents and settings, everyone's documents and settings, all information on this computer, or specific files and folders. Select My Documents And Settings, which will back up your My Documents folder, Favorites list, Desktop, cookies, and other settings. Click OK.

The default destination for the backup file is the diskette drive, but this is inadequate for most backups, even if you span the data across multiple floppies. Select another hard drive, a Zip cartridge, or other removable media as the destination, and click Browse. You'll be asked to insert a diskette into your diskette drive. Click



Windows XP displays the status of your backup, including the estimated time remaining and the estimated size of the finished backup file.

ly. Select Normal and click Next. Additional options include Verify The Backup Data Matches The Original (put a check mark here), Use Hardware Compression (not available for most users), and Disable Volume Shadow Copy (turns off the ability to copy open files). Leave this option unchecked and click Next.

You can now choose whether to overwrite an existing backup file or append this backup to it. Select Replace. Click Next to choose when to run the backup and then select Now. Click Next and then click Finish to start the backup. A status window will display the progress of the backup. When it's complete, close the window.

■ **Restore Files In Win98 & WinMe.** Restoring a backup is easier without the wizard, so when it appears, click Close. In the Microsoft Backup window, select the Restore tab. A dialog box will ask if you want to refresh the current view. Click Yes, and

Cancel. A standard Save As dialog box will open. Navigate to the target destination and enter a descriptive name for your backup file. The default name is Backup.bkf; include the .bkf file extension on whatever name you choose and click Save.

The new destination will replace the diskette drive. Click Next, and then click Finish to start the backup or click Advanced to change the backup mode. The choices are Normal, Incremental, Differential, Copy, and Daily.

Microsoft Backup will display a list of the backup jobs that you've run. Put a check mark next to the job you want to restore.

To restore the entire backup, put a check mark in the first box in the list of items that Microsoft Backup can restore. To restore specific files, use the What To Restore Window to select them. Use the Browse button to select a destination for the files.

Click Options to specify how Microsoft Backup should restore the files. The choices are: Do Not Replace The Files On My Computer (no files of the same name will be overwritten); Replace The File On My Computer Only If The File Is Older; and Always Replace The File On My Computer. Make your selection and click Apply.

If this backup includes a copy of the Registry and you want to restore it, select the Advanced tab, put a check mark next to Restore Windows Registry, and click OK.

To begin the restoration, click Start. A status box will display the progress of the restoration. When the operation is complete, click OK.

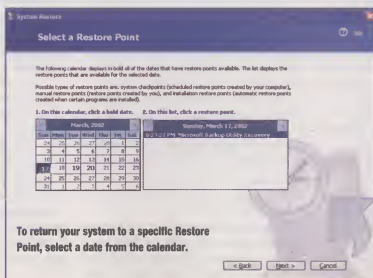
■ **Restore Files In WinXP.** Start the NT Backup program, and click Next. Choose Restore Files And Settings, and click Next. A Windows Explorer-style window lists the backup sessions that NT Backup has performed. Click the plus sign (+) to expand the window. Find the backup you want to restore, and click the plus sign next to its name.

In the expanded view, the root location of the backup will display. If you click the checkbox next to the C: drive, NT Backup will restore all data from that backup set. To restore specific files or directories, click the checkboxes next to the items you want to

restore. When you finish making your selections, click Next.

Now, NT Backup will show you what it will be restoring from, where the information will be restored to, and how existing files will be handled. To change any of these options, click Advanced. Otherwise, click Finish. A Restore Progress screen will display the progress of the restoration. When it's complete, click Close.

■ **Restore Your Win98 System.** If you need to reinstall Windows, use the Win98 PC Restore function. PC Restore



To return your system to a specific Restore Point, select a date from the calendar.

runs an automated Win98 installation process to ensure that all necessary files are present and in good working order. It then starts a System Recovery Wizard to restore the backup file you made with Microsoft Backup.

To start the restore process, boot from your Win98 startup diskette. Select the option to boot with CD-ROM support. Insert your Win98 CD-ROM; at the prompt, type `>> CD \tools\sysrec`

Press ENTER, and type `>> prestore.bat`

(Replace the letter *d* with the correct letter for your CD-ROM drive.)

After the Win98 setup starts, remove the startup diskette. When the setup is complete, the System Recovery utility will launch. Click Next, enter the necessary information, and click Next. When the System Recovery tool tells you that it's ready to proceed, click Finish.

Microsoft Backup will start as if this is the first time it's been used. If you need to install drivers for a dedicated backup device, click Yes; otherwise, click No. When the wizard starts, select the option to restore backup files. Locate your last full backup and click Next. Click Yes to refresh the current view. Select the most recent full backup from the list and click OK. Put a check mark next to each drive you want to restore, and click Next. When asked where to restore the files, select Original Location, and click Next.

When the How To Restore window appears, select the option to Always Replace The Files On My Computer and then click Start. Microsoft Backup will display the backup set media needed to complete the restore. Click OK. Microsoft Backup also asks if you want to restore the Windows Registry. Click Yes. Microsoft Backup then asks if you want to restore hardware and system settings. If you haven't added or removed any hardware since the last full backup, click Yes; otherwise, click No.

A status window displays the status of the restoration process. When it's complete, restart your computer. You'll need to reinstall any software you added after the last backup.

■ Restore Your WinMe Or WinXP System.

The System Restore function creates Restore Points, or backups of key Windows files. System Restore creates Restore Points automatically when you install applications. You can also create Restore Points manually. Either way, Restore Points let you roll your computer back to a previous state, which is very helpful when new software or hardware causes problems with your system.

What System Restore doesn't do, however, is back up your personal data files. For that, you'll need to use the Backup program.

To create Restore Points, open the Start menu and select Programs, Accessories, System Tools, and System Restore. Select Create A Restore Point and then click Next. Enter a meaningful name for your Restore Point, such as Install FireWire Card, and click Next. Your new Restore Point displays with the time and date added to it. Click OK (in WinMe) or Close (in WinXP).

To roll back to a Restore Point, open the Start menu and click Programs, Accessories, System Tools, and System Recovery. Select Restore My Computer To An Earlier Time and click Next. Select a date and a Restore Point and click Next. A message box will warn you to save and close any open files or programs. Click OK (in WinMe) and then click Next (in WinMe and WinXP) when you're ready to start the restore process. System Restore will take you back in time to the older Restore Point, restart your computer, and display the status of the restore process.

■ **Common Error Messages.** Now for the true troubleshooting chore: finding solutions to pesky error messages that pop up.

Backup device isn't available. If you reinstalled your OS or restored to an older OS' Restore Point, your backup device drivers may no longer be installed. Reinstalling the drivers should correct the problem.

Windows files are marked as busy. You may see an error message for the following files:

C:\WINDOWS\COOKIES\Index.dat
C:\WINDOWS\HISTORY\Index.dat
C:\WINDOWS\TEMPORARY INTERNET FILES\Index.dat

These files can't be backed up because the OS opens them at startup. You can ignore this error message; the files will be re-created the next time you use Internet Explorer.

This media is write-protected. Remove the write-protection or insert another media to continue. This error applies to Win98 and WinMe and refers to the fact that Microsoft Backup doesn't support CD-RW (CD-rewritable) systems. You'll need to write the backup file to your hard drive and then copy it to a CD-RW.

System Restore is off. This error applies to WinMe and WinXP. System Restore needs a minimum of 200MB of free space to operate. If there isn't enough space available, System

Unsupported NT Backup For Windows XP Home Edition

NT Backup presents a serious problem with Windows XP Home Edition. Although it's included on the WinXP Home CD-ROM, it's not installed with the system by default, and Microsoft considers it unsupported for use with WinXP Home. (NT Backup works fine in WinXP Pro and Microsoft does support this use.)

NT Backup includes the option to create an ASR (Automatic System Recovery) floppy diskette and backup set. ASR lets you restore your WinXP system to the state it was in before a particular problem existed by using the backup file set that NT Backup created. Unlike WinXP Pro, however, WinXP Home doesn't support the ASR process. There's no ASR prompt during the WinXP Home installation, so there's no option to restore your system to its last known working state.

You can work around this problem, but results are mixed. Using your WinXP Home CD-ROM, manually reinstall WinXP. When the installation is complete, and WinXP Home is bootable and working, install NT Backup from the CD-ROM. Start NT Backup and use the Restore function to select the last full backup set you created prior to the system failure. Use that backup to restore your system to its previous working state. ■

Restore turns off automatically, with no warning message. To avoid this problem, keep at least 200MB of free space on your hard drive.

■ **Get To Know Your System.** We've only looked at the basic functions and minor mishaps of the various Windows backup utilities. Spend some time becoming familiar with the more advanced options, which let you run backup jobs at specific times, intervals, or events. Automating the process is one way to ensure that you'll always have backups when you need them. [S]

by Tom Nelson and Mary O'Connor

Time Flies

Stop System Clock From Losing Time



Today's hectic world needs accurate clocks. Precise timekeeping is vital for air, sea, and space navigation, as well as monetary transfers, television feeds, and yes, computing.

PCs keep time in two ways: using a hardware and a software clock. The hardware clock, referred to as the RTC (real-time clock), uses your system's battery to keep time when your PC is off. When your PC is on, the software clock takes over. It sets itself to the hardware clock, and from then on, it keeps time based on the rate of interrupt requests from your system's BIOS (Basic Input/Output System).

But neither the hardware clock nor the software clock is more accurate than a cheap digital wristwatch. The RTC doesn't actually stay close to real-time and can gain or lose up to 10 seconds per day. And a software clock is usually less accurate because the frequency of interrupt requests varies, depending on how hard your computer works, how long it stays on, and the ambient room temperature. A software clock can gain or lose up to a minute a day.

Abnormalities in your home or office electrical system might affect the frequency of interrupt requests and cause inaccuracies in your software clock. A strong power spike (such as from a lightning strike) or dip in power (called a brownout) might reset your BIOS and RTC and could ruin your PC. To guard against power surges (periodic voltage increases), plug your PC into an effective surge protector. For protection against power spikes and brownouts, use a UPS (uninterruptible power supply).

If your computer keeps time relatively well when it's on but loses time while it's turned off, then your BIOS battery is probably out of juice. This battery, which maintains BIOS and time data while your PC is off, usually lasts for two to five years. When it burns out, your PC not only forgets the clock settings, it also forgets all the other settings in BIOS. A BIOS with a dead battery reverts to failsafe values, and, as a result, the computer still boots, but it runs at less than optimum performance. For example, a PC with a dead battery might run a 1.4GHz Athlon processor at only 500MHz with failsafe BIOS values.

Experienced technicians write down their BIOS settings before they run into trouble. To follow suit, check your BIOS settings. Restart your PC, press DELETE, ESC, or F1 (or another key as directed by your computer manual) as your PC boots up, and go through each section of the BIOS menu to write down the settings. Be careful not to change anything. Or, SiSoftware's Sandra Pro (\$29; <http://www.sisoftware.com>) can print out your computer's BIOS configuration for you.

There are some computer manufacturers that solder the battery directly to the motherboard, so if your PC manual tells you this is the case with your battery, you'll need to send the computer into a repair shop for a battery replacement. Fortunately, with most computers, batteries snap in easily and cost less than \$20. But if you're uncomfortable opening your computer case, have a professional insert the new battery.

To replace a worn-out battery yourself, unplug your PC and disconnect any attached peripherals, open the PC case, ground yourself by touching something metal outside the case (to discharge static electricity before you touch any delicate electronics), find the battery, write down which end (+ or -) faces up, and then remove it according to your PC manufacturer's instructions. You can take the battery to any electronics store and buy a replacement.

After you insert the new battery and close the PC case, restore the correct time (see the official U.S. time at <http://www.time.gov>) and the BIOS settings you wrote down or as detailed in the users manual that came with your computer.

If your PC loses more than five minutes a day while it's on, you may have faulty hardware. Check your PC manufacturer's Web site or call

its technicians to determine if your PC is prone to clock errors. You can solve some slow clock problems with a BIOS update, but in more serious cases, your manufacturer needs to replace the bad hardware. Dell computers built in late 2001 are prone to losing time quickly. See Dell's designated Knowledge Base Web page (<http://support.dell.com/us/en/kb/document.asp?DN=H01016518>) to see if you need a new BIOS or if your hardware needs to be fixed. The Sandra Pro application we mentioned earlier will let you know if it's time to update your BIOS.

■ **Synchronicity.** Adjusting your date and time settings manually is easy. Right-click the clock on your Taskbar and choose Adjust Date/Time from the pop-up menu to open the Date And Time Properties dialog box. Select the month, year, time, and time zone, and click OK to set the hardware and software clocks.

If you use Windows XP and have a full-time Internet connection, you can automatically synchronize your PC's clock with a time server. In the Date And Time Properties dialog box, choose the Internet Time tab, and select the Automatically Synchronize With An Internet Time Server checkbox. Microsoft's server (listed as "time.windows.com") isn't connected to an atomic clock, so select the "time.nist.gov" option from the drop-down menu or type one of the suggestions listed below in the Server field, and click Update Now (you must be online to do this).

- time-a.nist.gov
- time-b.nist.gov
- tick.usno.navy.mil
- lock.usno.navy.mil

If you're able to connect to the time server and your firewall doesn't block you, your system clock will be accurate to within half a second of an atomic clock, which is about as close to accuracy as a PC clock can get. WinXP automatically sets your clock on a weekly basis. Please note, however, that some computers with unusual hardware configurations lose time if you enable automatic synchronization. If your PC loses more than five minutes a day, Microsoft recommends disabling this feature.

Or, keep your clock in sync using NISTIME (free download, see Software And Instructions area on the right side; <http://www.blrdrdc.gov/timefreq/service/its.html>). You can configure NISTIME to run in the background and query a server several times a day to keep your system clock continuously accurate. [E]

by Andrew Kuster

Memory Is The First Thing To Go

Help Your System Stop Running Low On Memory & Resources

Memory. Whether you're talking about a person or a computer, it seems like you can never have enough. In fact, one of the more common hardware upgrades on existing computers is bolstering the amount of memory. But how many of us have breathlessly waited for our computer to boot after installing more memory, only to discover with disappointment that the system still chugs along at a snail's pace?

So what's the deal? Why does your computer always seem to run out of computing steam and display scary messages such as, "Your computer is dangerously low on system resources. Reboot now or else."? We'll provide you with that information in this article, along with some strategies on how to best deal with memory issues.

■ **Thanks For The Memory.** First, let's take a quick look at how memory works. Think of memory as the working space in your computer; just as a larger office accommodates more workers, so too can more memory accommodate more programs.

Although there are technically different types of memory, we'll mainly refer to RAM (random-access memory) in this article. RAM's main job in the computer is to hold onto instructions and data so the computer's CPU (the brains of the system) can grab them very quickly. For example, when you start an application, such as a game, the CPU loads the program from the hard drive and puts the program into RAM. When you give the computer a command through the keyboard or mouse (such as: "turn that card over in Solitaire"), RAM streamlines the processing by having the

program's commands handy. Think of RAM as a servant who's ready to perform at the CPU's beck and call.

But sometimes RAM isn't a very good helper. If your computer has any of the following symptoms, it may be faltering because of memory (or low resource) problems.

- Frequent crashes—you know, those heart-stopping events where your computer arbitrarily stops responding to the keyboard and mouse. Even though all systems occasionally freeze, if yours seems particularly ill-behaved, think of this in terms of low memory or resources.
- Sluggish performance, especially if you're running relatively few programs compared to the amount of installed memory.
- Trouble at startup time. For example, be suspicious if the system has difficulty booting up, loading Windows, or simply beeps a lot. (One note: If your computer does this,

count the beeps. A good computer technician will be able to decode what the sequence means.) Another startup problem involves your computer going into a nasty bootstrap sequence that repeats frequently.

- Displaying memory (or other types of) errors, such as, "You're running dangerously low on system resources."
- A discrepancy between the amount of installed memory and the amount of memory Windows *thinks* it has.

If any of these sound familiar, take heart. There are a number of reasons why the memory installed on your computer may not work as you expect. Let's take stock of them, one by one.

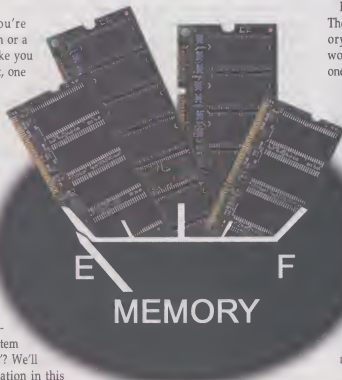
■ **Check Memory Modules.** Your first step is to look at your computer's physical memory components. Here are a few things to check:

- Make sure the sockets that hold the memory modules are clean and free of dust. A clean connection is a fast, efficient connection.
- Make sure memory modules are seated in their sockets. Because memory modules vibrate, they can potentially become dislodged.
- Examine the memory sockets and modules to make sure they are not burnt or broken. If they are, replace them.

■ **Get Rid Of Greedy Programs.** The next place to look when memory is being drained is to see if there are unwanted programs loaded in memory. One way to do this is to press CTRL-ALT-DELETE. This displays the Task Manager's Close Program dialog box, complete with a list of running programs. You'll probably be amazed at the number of programs running, especially if you're sure you didn't load them into memory.

Here's the explanation: Many programs automatically add themselves to your computer's start sequence if you install them using default settings. If this gets out of hand, pretty soon you have a situation where these "hidden" startup programs have hijacked much of the memory, thereby slowing down the programs you *really* want to use.

Finding out (via the Task Manager) which programs are running loose in memory is just the first step. Of course, you can manually close the unwanted programs after you start



the computer each day, but a more permanent solution is to disable them in the startup sequence. The best way to do this is to use the System Configuration Utility. From the Start menu, choose Run, type `msconfig` in the field provided, and click OK. In the System Configuration Utility dialog box, click the Startup tab and deselect the checkboxes next to the programs that you *don't* want to load at startup.

But be careful. Don't deselect the checkboxes for key programs, such as System Tray (listed as Systray or Systray.exe), Windows Explorer, or other files that are critical to running your OS (operating system). If you have any doubt about whether to disable a file, then don't do it or else things might look pretty bleak the next time you try to start up your computer.

Instead of using the System Configuration Utility to find out which programs are used at startup, you can use the System Information tool. To do this, choose Run from the Start menu, type `msinfo32.exe` in the field, and click OK.

Virtual Memory Settings. Another good plan is to check the virtual memory settings on your computer to make sure performance is optimized. Virtual memory is hard drive space that's used as extra memory in a swap file. It lets you run more programs (or run them faster) than you could with just the installed RAM. Normally, it's best to let Windows handle the size of the swap file that it creates because it can increase and decrease the size dynamically, depending on the need at the moment.

To check that this setting is in place, click Start, Settings, Control Panel, and then double-click System. In the System Properties dialog box, choose the Performance tab. Click the Virtual Memory button and make sure the option for Let Windows Manage My Virtual Memory Settings is selected before closing all the dialog boxes.

Even armed with these tricks and tools, you may find that you need to install additional memory modules

to make your computer system purr. If so, just make sure the memory is compatible with your version of Windows and that it's properly installed.

Where Did All The Resources Go? You'd probably expect that your system should operate more efficiently if more memory is available. In general, this is

true. However, throwing more memory at your computer may not solve the drain on your system completely. The reason? Because you also need to take the drag on system resources into consideration.

Most people lump system resources in the same category as memory. But memory and system resources are not really the same thing. In fact, it might appear that you have plenty of memory to run the programs at hand, yet you keep getting an ominous

"system resources are dangerously low" type of message plastered on-screen.

Here's why: When you're working with Windows, everything you see and do is built from a group of objects, such as icons, windows, menus, and fonts. Everything you see and do relates to these objects and makes up the "total Windows experience." But Windows has to track things about each object you're using—such as its location in memory, its status, its colors, and so on—and make sure the objects don't trip over each other during your work session. The amount of memory set aside for system resources is only a small part of the total installed RAM in most systems. Because of this, you can still run low on system resources, even if it appears that you have plenty of RAM for your programs.

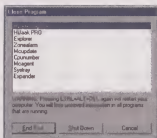
Windows' Influence On System Resources. How well system resources are managed is partly determined by the version of Windows on your system. Windows 3.x was notorious for poorly managed resources; Windows 95, Windows 98, and Windows Me handle the resources better than Windows 3.x did, but not as well as Windows NT, Windows 2000, and Windows XP do.

Win9x (Win95 and Win98, collectively) and WinMe limit the resource pool to a specific size on purpose. Limiting the size of system resources helps to ensure backward-compatibility with 16-bit programs, especially those originally written for DOS and Win3.x. In other words, you don't have as many resources, but the ones you have will still run older programs.

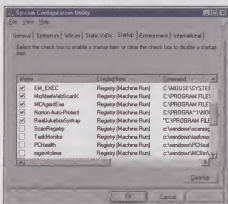
In contrast, WinNT, Win2000, and WinXP don't have the resource-drain plague of the Win9x group, but they also don't have very good backward-compatibility (which means

you may not be able to run your favorite 16-bit programs using these OSes). Despite this, upgrading to these versions might help in managing these system resources.

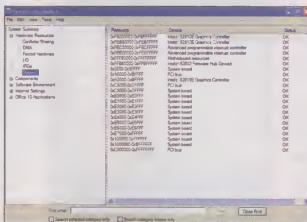
Watch Resource Levels. Of course, managing the available resources can be tricky at best. They can be sucked away by programs running in the background, unnecessary animations, and a host of other evils. Let's look at a couple of easy ways to check the fluctuating level of resources available on your system, and see how to keep them from running low on your system.



The Task Manager helps you find out which programs are loaded into memory.



You can keep startup programs from taking over RAM by using the System Configuration Utility to disable them.



Use the System Information window to check the status and settings of various computer components.

Like a fuel gauge on your SUV, you can periodically view how your system resources are faring. One of the better ways to check the level of free resources on your system is to use Windows' Resource Meter. Available in Win9x and WinMe, you can launch this utility by opening the Start menu, and choosing Programs, Accessories, and System Tools.

After you open the Resource Meter, it appears as an icon at the right end of the Taskbar in an area known as the System Tray. This icon is color-coded so you can tell at a glance how your resources are doing: Green indicates the system has plenty of resources; yellow means you're getting low. If you see red, you'd better save whatever you're doing right away because you're in the danger zone.

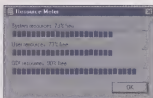
To see a readout of how your system is faring, double-click the Resource Meter. Alternately, you can rest your mouse pointer over the System Tray icon to view the status of your system resources in a ScreenTip (small message flag that pops up).

You can also find out which resources are free by displaying the system properties. To do this, click Start, Settings, Control Panel, and then double-click the System icon. Choose the Performance tab to see the amount of memory on your system, as well as the total percentage of resources free.

Besides systematically tracking the free resources, you might suspect that your computer is getting low on fuel if you receive error messages when you try to launch programs, your computer runs slowly, on-screen graphics don't seem to update well, applications hang, or the system crashes.

■ **Other Sources Of System Drain.** Once you know how to monitor your system's resources and understand some of the potential causes for losing resources, it's time to go sleuthing for potential resource bandits.

One area to watch when system resources are heading south is greedy programs—those that latch onto system resources when you open them but then never fully abandon the resources later. Here's the problem: Every time you start a program, you use some of the system's resources. In theory, when you exit the program, it releases all the resources so they are completely available for the next task at hand.



Check out your system's resources by displaying the Resource Meter in a window or as an icon in the System Tray.

But this isn't always true in real life. Some badly written programs (especially the older, 16-bit ones) don't let go of 100% of the system resources they used while running. This issue is what's known as a memory leak.

A short-term solution for recovering the system resources lost through memory leaks is to restart Windows. This frees up the resources and returns everything to normal. And the long-term solution? Upgrade to WinXP or Win2000, both of which are based on the WinNT architecture and have better resource management than the Win9x family does.

■ **More Fixes.** To gain system resources and/or memory, exit any programs that you're

not actively using. Sure, it's handy to have Outlook sitting open on your Desktop and leave a few games running so you can play them during break time, but the cost in system performance to do this may not be worth it.

Plus, you should evaluate which programs you use and which ones you habitually leave open. Some programs are resource hogs. For example, the worst culprits for stealing memory and system resources are Web browsers, graphics-heavy applications, and multimedia programs. In some cases, opening and closing several browser windows, as well as just surfing the Web, can create a serious drag on your system resources.

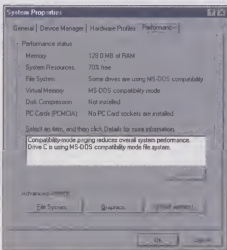
If you're surfing the Web, also watch out for advertising and pop-up windows that open behind (or in addition to) the active window. These can guzzle system resources in a hurry. To see if extra browser windows have opened already (or are currently opening), glance at the Taskbar. Close the extra windows.

Additionally, consider turning off your Web browser's display of pictures and multimedia animations, including advertisements. To do this in Internet Explorer, for example, open the Tools menu, click Internet Options, and then click Advanced. In the Multimedia section, deselect the checkboxes next to Pictures, Sounds, and Animations. Sure, you won't be able to see all the bells and whistles on a Web page, but you'll find that your browser will quickly snap to attention.

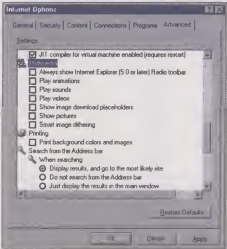
■ **Change Display Elements.** Other things that can guzzle system resources are colors, animations, backgrounds, and elaborate screen savers. Because of this, you can unburden resources by minimizing the use of these items.

To change your system's display properties, right-click the Desktop and choose Properties. In the Display Properties dialog box, choose None for the Background and Screen Saver options. On the Effects tab in the dialog box, deselect all the checkboxes in the Visual Effects section. On the Web tab, make sure to deselect the checkbox next to Show Web Content On My Active Desktop. This will turn off the Active Desktop, and in doing so, help to manage resources better and prevent system freezes.

So don't despair. Your computer can run more smoothly without tripping over low memory or resource problems. **15**



The System Properties dialog box gives you a basic overview of how efficiently your system is set up.



From the Internet Options dialog box, turn off multimedia effects to unburden system resources.

by Linda Bird

DVD changed the way you see movies.



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Unload The Overload

Prevent Programs From Automatically Loading At Startup



Microsoft has successfully decreased boot time for the Windows OS (operating system) throughout its evolution, but despite Microsoft's best efforts, various programs continue to find ways to slow Windows down. Installing certain applications often adds TSRs (terminate-and-stay-resident programs) that Windows loads each time it boots. For example, installing MSN Messenger results in its System Tray (the far right end of your Taskbar) component (MSN Messenger Service) loading every time you boot your PC, regardless of whether you plan to use it. Other examples of applications that clutter your System Tray at startup with TSRs include RealPlayer (and others from RealNetworks), AIM (AOL's Instant Messenger), and several popular office suites. Of course, there are many, many more.

Not all programs loading at startup are bad, of course, and some provide useful features. For example, you probably want your antivirus application or firewall software to automatically load just to be safe. But regarding the majority of TSRs that force themselves on your system at startup, many users would rather start these programs manually on a need-to-use basis instead of watching them bog down Windows.

Unless you enjoy that trip to the break room for coffee and a bagel while waiting for Windows to load, we have some easy methods for tuning up your Windows OS and decreasing its boot time. Use these tips wisely and you may even be able to turn on your PC and check your e-mail before making that quest for coffee to speed up your *own* boot time.

■ **Trim Windows Startup.** You can easily disable TSRs by right-clicking each of their icons in the System Tray and selecting a command such as Close, Suspend, Disable, or Exit. But that's only a temporary solution. The easiest method for preventing unwanted TSRs from loading in the first place is to remove them from the Windows Startup group.

Windows 98, Windows Me, and Windows XP all have a Startup group. Open the Start menu, select Programs (or All Programs), and click the Startup folder to see which programs load whenever you boot up Windows. (Granted, the Startup folder doesn't include *all* these programs, but we'll talk more about that in a moment.)

You can remove most, if not all, of the programs located in the Startup folder by right-clicking the icon for the program and selecting Delete from the pop-up menu. This action won't actually delete the program; it only deletes the shortcut that program uses to automatically load. If you don't want to delete the shortcut, you can select Cut instead of Delete, right-click your Desktop, and select Paste to place the shortcut there instead. This prevents the program from loading during startup and gives you easy access to its shortcut.

Preventing instant messaging programs, such as MSN Messenger and AIM, from loading while Windows boots is a good idea for security reasons, as well. When users install and set up instant messaging programs, many also configure them to remember the username and password and automatically log in, which is what happens every time Windows boots and loads the instant messaging program. So, if you don't want your kids telling your golfing buddies your sordid secrets, remove the messaging programs from the Windows Startup group or don't configure them to remember your username and password.

Not all programs let you remove them from the startup process just by eliminating them from the Startup group, and not all programs loading during startup even appear in the Startup group. But we have another, more powerful tool we can use to remove such programs.

■ Use The System Configuration Utility.

Because not all programs loading at startup appear as icons in the Startup folder, users must be on the lookout for hidden programs. Remove these programs by using Mscconfig, or the System Configuration Utility. To do so, click Start, select Run, type `mscconfig` in the field provided, and click OK. This will work for Win98, WinMe, and WinXP systems.

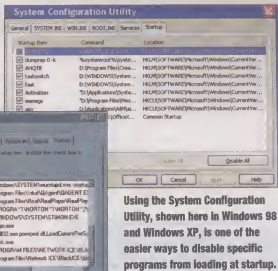
From the System Configuration Utility, click the Startup tab to view a list of programs Windows loads each time it starts. Next to each program is a checkbox. Deselect the checkbox for each program you don't want loading at startup. Win98 users should also click the Win.ini tab to view the contents of that file. Open the Windows folder and look for a Load= and a Run= line. If there are programs listed here that you don't want to load, deselect the checkboxes for both lines. Click OK once you finish and reboot.

One minor disadvantage to using the System Configuration Utility is that some programs aren't easy to recognize because of their cryptic labels, such as Rundll32.dll. Our advice is to first remove programs from the Startup folder, and then use the System Configuration Utility to disable any hidden items that you are sure can be safely removed. Programs such as RealPlayer (listed as RealTray), MSN Messenger Service (listed as Msmgs), and Quicken Download Manager (listed as QAGENT) are all good candidates to disable. Another good rule of thumb is this: If you can easily start a program from the Start menu or the Desktop, and it's a program you don't always use, you don't need it slowing down Windows every time it boots.

■ **Eliminate DOS Throwbacks.** This tip only applies to Win98 systems, which often load unnecessary DOS programs from the Autoexec.bat and Config.sys files before Windows even begins loading. Examples of such throwbacks (called legacy software) include programs that initialize sound cards for DOS mode, antivirus executables, and even mouse drivers for DOS.

The System Configuration Utility is the best tool for eliminating legacy software. The Win98 version displays program tabs for the Autoexec.bat and Config.sys files. Deselect the checkboxes next to any unnecessary items you recognize on these tabs to prevent them from loading. But if you're not sure about an item, it's probably best to leave it alone.

■ **Edit The Registry.** If you find (and we're sure you will) there are still programs you couldn't disable by other means, your only option may be to edit the Windows Registry.



The Registry is a database of all your Windows settings, from Desktop colors to program preferences to hardware information. Because the Registry is the vital, beating heart of the Windows OS, tampering with it is like open-heart surgery for Windows, and it's not recommended for novices. Mistakes made while editing the Registry could result in leaving Windows motionless on the operating table. (Fortunately, we can always reinstall our OS, so it's not completely fatal, but it's darn inconvenient.)

Before editing your Registry, be sure to back it up. Win98 users can perform a backup by running the System Configuration Utility and clicking the Create Backup button on the General tab. If it's necessary to restore the backup files, simply return to the System Configuration Utility and click Restore Backup.

WinXP and WinMe users need to run their version of the System Configuration Utility and click the Launch System Restore button. Next, click the Create Restore Point radio button, type a name for the restore point (the date of the backup is a good name), and click the Create button. If you need to revert back to your backup, run the System Restore program by clicking Start, Programs (All Programs in WinXP), Accessories, System Tools, and System Restore. Note that the System Restore utility will only help you recover from nonfatal Registry problems. In other words, if Windows dies, System Restore can't bring it back.

We don't have room in this article to go into more detail about backing up and restoring the Registry, so just make sure you back up your Registry before editing it and have a backup plan in case things go awry. For more information, see "No Going Back" on page 110.

Once you're ready, click Start, select Run, type regedit in the field, and click OK. Navigate to HKEY_LOCAL_MACHINE\SOFTWARE\MICROSOFT\WINDOWS\CURRENTVERSION\RUN, where you'll see a list of programs. Assuming you've run the System Configuration Utility at least once before, you'll notice the data stored in this Registry key is essentially the same as what you see on the Startup tab of the System Configuration Utility. Because Microsoft didn't intend for end-users to edit the Registry, the Registry Editor doesn't display information in an easy-to-read fashion (another good reason why you need to make absolutely sure you know what

you're changing). All you need to do to remove a program from your Windows startup is click the Registry entry and press the DELETE key on your keyboard.

Using the Registry Editor, you can also wipe out any program that has a nasty tendency of re-enabling itself despite your best efforts to remove it from the Windows startup with the System Configuration Utility.

■ **No Time To Wait.** Finally, after making some of the changes we suggested in this article, Windows will probably ask you to reboot. Take this opportunity to do so and see how much your system's startup process improves. Although we could probably argue that reducing Windows' boot time increases productivity, the truth is that a faster boot time really just makes us less irritable—but hey, that's important, too. We don't like waiting, no matter what the situation is: waiting in line, waiting for the bus, or waiting for our computers to boot. And anything to reduce the tiny stresses of daily computing is worthwhile in the long run.

We've given you several ways to speed up the Windows startup process, reduce stress, and help you live a longer, happier life (OK, that last comment is probably a stretch, but we'd like to think we're doing good things for you). Deleting shortcuts from your Startup folder and using the System Configuration Utility are probably the most any of us will ever need, and they are the simplest and safest methods to use. But for those of you who have a vendetta against errant programs and don't mind getting a little daring, consider the Registry Editor as your ace in the hole. ☐

by P. Bryan Edge-Salvis

Decipher & Solve Error Mysteries

Use Windows Woes
To Identify Culprits
& Deal With Them Accordingly



Whether you're new to Windows or a seasoned veteran, you've likely confronted puzzling Windows error messages. Although these messages are supposed to help you troubleshoot problems, their cryptic terminology can be difficult to decipher. Even worse, these messages occasionally offer alarming, unnecessary suggestions to fix the problem, such as "You must reinstall Windows." If you haven't previously researched the information contained in these messages (and who has time for that?), you may think you have no choice but to follow such drastic advice.

This article discusses common, confusing error messages found in Windows 98, Windows Me, and Windows XP, as well

as how to handle the problems these messages identify. As you'll discover, many error messages simply provide a starting point for troubleshooting, not a reason to panic. And yes, some errors are indeed caused by a complex series of problems, but most are caused by easy-to-fix software or hardware misconfigurations.

■ **Rundll Illegal Operation (WinMe).** If you're a WinMe user, you might encounter one of the following two errors: "Rundll32 - This program has performed an illegal operation and will be shut down" or "Rundll - This program has performed an illegal operation and will be shut down." If you click the Details button and see that this GPF

(General Protection Fault) occurred in the `Mmsystem.dll` module, you can breathe easy—the fix is simple.

The problem is that the "drivers=mmsystem.dll" line is missing from the [boot] section of the `System.ini` file. To put it back in, open the `System.ini` file (found in the `C:\WINDOWS` folder, or wherever your Windows folder resides) in Notepad or another text editor. If you don't see the file in Windows Explorer, click Tools, select Folder Options, and then click the View tab. Deselect the checkbox next to Hide Protected Operating System Files (Recommended). Click OK and look for `System.ini` again. Type the following line to the [boot] section: `drivers=mmsystem.dll`

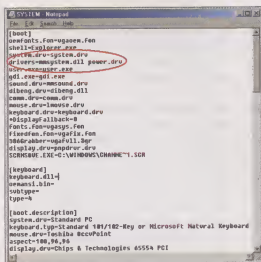
Save and close the file. Reboot your computer. After the reboot, you can hide your protected files again using Tools, Folder Options in Windows Explorer.

■ **Error Loading Explorer.exe (Win98 & WinMe).** The following error message can appear during Windows startup and is likely to cause severe panic: "Error loading Explorer.exe. You must reinstall Windows."

If you click OK, a black screen appears and you can't restart Windows. Oh, joy! Luckily, in most cases you won't have to reinstall Windows. Instead, you'll have to replace the `Explorer.exe` system file because it's probably missing or corrupt.

In WinMe, reboot your computer using your Windows startup diskette (you *did* previously create one, right?). In the startup dialog box that appears as the computer boots, type 2 and then press ENTER. Write down the drive letter that Windows startup has assigned to your CD-ROM drive. Type ext and press ENTER. At the "Please enter the path to the Windows CAB files (a):" message, type `d:\win9x` (where *d* is your CD-ROM drive letter) and then press ENTER. At the "Please enter the name(s) of the file(s) you want to extract:" message, type `explorer.exe` and then press ENTER. At the "Please enter the path to extract to ('Enter' for current directory):" message, type `c:\windows` (where *c* is the drive where your Windows folder resides), then press ENTER. Type *y* at the "Is this okay? (y/n)" message, then press ENTER.

After the file is extracted, remove the startup diskette from your floppy diskette drive and reboot. If you're using Win98, you'll follow the same process, except in the startup dialog box, type 1 instead of 2, and at the



If the `Drivers=mmsystem.dll` line is missing from the `System.ini` file on your system, you could encounter an illegal operation error.

"Please enter the path to the Windows CAB files(a):" message, type `d:\win98` (where `d` is your CD-ROM drive letter).

■ Invalid VxD Dynamic Link Call (Win98 & WinMe). This error occurs when you boot your computer, receive the Windows splash screen, and the computer automatically reboots to the Startup menu. If you choose Normal Mode at startup, you'll get the following message: "Invalid VxD dynamic link call to device 3, service B. Your Windows configuration is invalid. Run the Windows Setup program again to correct this problem."

You'll be able to boot into Safe Mode with no problems, but you'll have a difficult time finding the culprit. Although this error is alarming, you can fix it without using the Windows Setup.

The most likely suspect for this behavior is your `System.ini` file, which may be corrupt and could be blank. Therefore, you'll need to snag a new copy of the `System.ini` file and replace your corrupt file. To do so, reboot your computer and select Safe Mode when prompted. Next, double-click My Computer and open the drive wherever your Windows folder resides. If no files appear in the Windows folder, click Show Files.

Next, click Folder Options from the View menu, and on the View tab, clear the checkbox next to Hide File Extensions For Known File Types. Instead, select the Show All Files checkbox. Click OK. Find the file called `System.ini`, right-click it, click Rename from the pop-up menu, type `system.old`, and press ENTER.

In the same directory, double-click the Sysback folder and from the View menu, click Details, Name (this will sort the files by name). Look for the most recent `Rb*.cab` file dated prior to when you had trouble booting into Normal Mode. After double-clicking this file, right-click System.ini and click Extract. In the section called Choose A Folder In Which To Save The Files, browse to `C:\WINDOWS` (or wherever your Windows folder resides), and click OK.

After closing the CAB file, go to `C:\WINDOWS` and double-click `System.ini`. If this file is still blank, repeat the steps we just mentioned in the previous paragraph, starting with double-clicking the most recent `Rb*.cab` file dated prior to when you started experiencing trouble, except this time, pick a `Rb*.cab` file dated a little bit earlier than the last one you chose. Finally, close `System.ini` and reboot your computer.

■ Program Not Found (Win98 & WinMe). A common but frustrating error, the "program not found" error can occur in a variety of situations. Typically you'll receive one of two error messages: "Program Not Found. Windows cannot find Microsoft.exe. This program is needed for opening files of type '<Filetype>'. This file does not have a program associated with it for performing this action. Create an association in My Computer by clicking View and then clicking Options."

You might see the Open With dialog box open, and this box might even appear on the Desktop every time the computer boots up. When this happens in WinMe, a caution message warns that you're trying to open a particular file type. In this case, clicking Open With conjures the Open With dialog box, while clicking Cancel will get rid of the message (but not for good; it will reappear the next time you boot your system).

When Windows can't find the program that's supposed to open the file you asked it to open, it's generally because the file isn't associated with the correct program, or the program's Registry values are damaged or missing. Errors of this nature occurring upon startup are caused by program shortcuts that are either pointing to an incorrect file or program, or they aren't pointing to anything at all.

When confronted with a "program not found" error, you can fix it easily. In Win98,

click Start, Settings, Folder Options, and then click the File Types tab. Click the file type you're trying to open in the Registered File Types list and then click Edit. In the Actions area, click Open, Edit, and Browse to find the correct program. Then, click Open, OK, Close, and Close again.

In WinMe, click Start, Settings, and the Control Panel. Click Folder Options from the Tools menu and then choose File Types. Click the file type you're trying to open in the Registered File Types area and then click Advanced. In the Actions area, click Open, Edit, and Browse to find the right program. To finish, click OK, OK, and then Close.

■ Error Loading Kernel (Win98 & WinMe). Here's another fun error message. This one happens when you start Windows, and right before Windows quits, you'll receive this message: "Error Loading Kernel. You must reinstall Windows."

Great! But don't despair—it could just be that your `Kernel32.dll` file is missing or damaged. To fix it, you'll need to grab a new copy of the file from your Windows installation CD-ROM.

First, reboot your computer. If you're using Win98, hold down the CTRL key while the computer is booting until you see the Startup menu, and choose Command Prompt Only. If you're using WinMe, boot your computer with your WinMe startup diskette. At the command prompt, type the following lines and press ENTER after each:

```
cd\windows\system
ren kernel32.dll kernel32.xxx
```

Use the Extract command to get the new copy of the `kernel32.dll` file from your Windows CD-ROM. To do this, type `extract` at the command prompt to display easy instructions about using this command. Finally, restart your computer.

■ Thread Stuck In Device Driver (WinXP). In WinXP, you might receive a blue screen along with the following error: "STOP 0x000000EA THREAD_STUCK_IN_DEVICE_DRIVER."

These "STOP" errors are fairly common in WinXP, and in this case, a video hardware or driver problem is causing the system to hang, so you'll first need to update your video driver.

Download the most recent driver for your video card from the manufacturer's Web site. If your card's manufacturer doesn't carry drivers and you're using an NVIDIA-based video card,

you can download updated drivers from NVIDIA's site (<http://www.nvidia.com>). The driver will be either a self-installing executable (EXE) file or a compressed file that you need to decompress with a utility into a temporary folder. We recommend creating a temporary folder on your Desktop (or elsewhere) that you can use for this process and any future temporary extractions. Also, save and close any open documents or programs before installing any drivers.

If you're dealing with a compressed file, decompress it first, and then open the Start menu and click Control Panel, Performance And Maintenance, and System (if your Control Panel displays as a submenu, just double-click System). Choose the Hardware tab, click the Device Manager button, double-click the Display Adapters branch, right-click your particular display adapter, and click Properties. Choose the Driver tab and click Update Driver. Follow the process to update your driver and reboot your computer if necessary.

If the driver update you downloaded is an executable file, double-click it and follow the prompts to install your drivers.

If the error occurs even after updating your driver, turn off and unplug your computer, disconnect all the peripherals from your computer, touch something metal outside of your computer case (to discharge static electricity), and remove the case lid. Next, disconnect any cables attached to your video card from the outside of the case and carefully remove your video card. Reseat the card firmly back in its slot, put the case lid back on, reattach all the cables, and boot your computer.

If you're still receiving the error, it's possible that your video card will *never* operate properly with WinXP because of compatibility problems, even if the card is listed as compatible with WinXP. While this situation is rare, hardware flaws or damage will cause a video card to work improperly in any OS (operating system).

To work around this error, open the Start menu and click Control Panel, Appearance And Themes, and Display (if your Control Panel displays as a submenu, just double-click Display). Choose the Settings tab, click Advanced, and then choose the Troubleshoot tab. Slide the Hardware Acceleration bar to None, and then deselect the Enable Write Combining checkbox. Click OK, then click OK again. This will result in a loss of functionality and performance, especially in 3-D-accelerated games and

photo manipulation programs. However, if you've updated the driver and checked the hardware, you might be stuck with decreased output if you want stability with your current video card.

■ **MPREXE Not Responding (Win98 & WinMe).** One of the most common—and difficult to track—error messages in Windows is “MPREXE not responding,” which can occur after you log on to Windows or after you install it.

Typically, by the time you see this message, you can't do a thing in Windows because it's already frozen. The reason why this error is difficult to track is because a plethora of problems can cause it. Let's take a jaunt through the possibilities and examine ways to fix them. We listed the following fixes in the order you should try them (if the first method doesn't work, try the next one, and so on).

First, re-create your password list (PWL) file because it might be corrupt. But before you do so, please note that if you're using a personal certificate such as Thawte or VeriSign, you must export the certificate before you rename your PWL file; otherwise, the certificate may not be available afterward when you send e-mail messages.

To re-create the password file, click Start, Find, and For Files Or Folders. Type *.pwl in the Named field and click Search Now. Right-click the Username.pwl file and click Rename from the pop-up menu (replace Username with the name you use to log on to Windows). Rename Username.pwl to Username.old and press ENTER.

Reboot your computer (or just restart Windows), and when prompted, enter your

password. If you didn't previously use a password, leave the password space blank, click OK, and click OK again to confirm the password. Windows won't ask for a password the next time you log on.

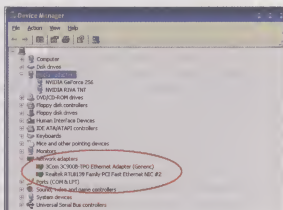
If the re-created password file doesn't work, your system might be experiencing conflicts with a service or program. You'll need to perform a clean boot of your computer to help isolate the problem. See a Microsoft Knowledge Base (<http://support.microsoft.com/search>) article for instructions about clean booting. After accessing the Searching The Knowledge Base Web page, scroll to the bottom of the page, and in the field provided, type Q192926 if you have Win98 or type Q267288 if you have WinMe. Click the green arrow and the page of instructions you need will soon appear on-screen.

Still having trouble? Try disabling user profiles (if you're using them). Right-click Network Neighborhood, click Properties, and then choose the Access Control tab. Click Share-Level Access Control, and then click OK. Reboot your computer. If this solves the problem, re-enable the profiles after a successful boot and restart your computer.

If the error message appears again, look for hardware conflicts in the Device Manager. Right-click My Computer, select Properties, and then click the Device Manager tab. If you see any device that has a red X or yellow exclamation point (!) beside it, double-click the device listing and select the Disable This Device checkbox. Click OK and reboot. (If you have more than one device with an X or exclamation point beside it, repeat these steps for each device, one at a time, to determine which device is causing the error.)

If you don't see the error message after rebooting, then you've managed to pinpoint the device that's causing the problem. You should ensure that the problematic device is installed properly and update or reinstall the device's driver. Even if you don't see any hardware devices that are marked with the X or exclamation point (!), it's still a good idea to make sure all of your drivers are up to date for all devices.

Are you still encountering the error after updating drivers? Check to see if your user profile is corrupt. Log on to your computer with another username (use one that doesn't receive this error) and locate the user profile you were using when you got the error message. See C:\WINDOWS\PROFILES or



A malfunctioning network adapter can spawn the “MPREXE not responding” error message, so if you're not sure if your system uses one of these adapters, check the Device Manager.

wherever your Windows and Profiles folders reside. After moving the potentially corrupt user's folder to another location, log off and log on as that affected user. This will re-create your user profile and that might solve your problem.

If not, ensure that you're not using one of the following reserved words as your username: UX, CON, COM1, COM2, COM3, COM4, PRN, LPT1, LPT2, LPT3, or LPT4. If you are, log out and log back in with a different username.

If you're still having problems, move on to the next troubleshooting item: your network adapter. If you use a network adapter for your Internet connection or home network, consider removing the adapter and reinserting it to see if that helps. Turn off your computer, unplug all the cables to the computer and the wall outlet, discharge static electricity by touching something outside your computer case before

opening it up, and remove your network adapter. Next, reseal it firmly in its slot, close your case, and boot your computer.

■ **Windows Explorer Error in Browseui.dll (WinMe).** Here's a startling error: When you start your computer, the Windows Desktop is completely white and only displays a sole error message: "Explorer has caused an error in Browseui.dll."

WinMe prompts you to change your Desktop settings because Active Desktop is turned off, but you get the same error message when you do change the settings. At this point, your computer hangs. The most likely problem in this case is corrupt Registry entries, which you can purge and replace with the Registry Scan utility.

First, reboot your computer with your WinMe startup diskette. Select the Start Computer Without CD-ROM Support option and press ENTER. When the bootstrap process

reaches the point of displaying the command prompt, type `scanreg /fix` and press ENTER. Wait for the Scanreg utility to do its job, which should include removing those corrupt Registry entries and replacing them with working copies. Restart your computer.

■ **Setup Cannot Copy The File (WinXP).** The WinXP installation and upgrade process thankfully does away with many of the configuration nightmares inherent in previous Windows versions. However, it does exhibit a nagging error that plagues many installations and upgrades: "Setup cannot copy the file *file_name*. Press X to retry, Y to abort." (*File_name* is the file that WinXP's Setup cannot copy.)

We've experienced this problem on numerous WinXP installations with different discs, and the error message delivers no clue as to what the problem is or how to fix it. The bad news is that this error isn't always easy to

Decode Errors

Windows error messages fall into several categories. Determining what type of error you've encountered helps immensely when it comes to troubleshooting the problem. Let's look at the major categories.

Type Of Error	Operating System	Likely Cause	Example
Fatal Exception	Windows 98/Me	An illegal instruction is accessed, invalid data or code is accessed, or the privilege level of an operation is invalid	"A fatal exception 0E has occurred at 0028:C02A0201 in VXD IOS(0s)+00001FC9."
Windows Protection	Windows 98/Me	Motherboard malfunction, damaged Registry, driver conflicts, virus, I/O (input/output) or RAM conflicts, plug-and-play BIOS misconfiguration, damaged Win.com or Command.com file, or malfunctioning cache	"While initializing device CONFIGMG Windows Protection Error. You need to restart your computer."
STOP	Windows XP	Hardware conflicts, including incompatible devices and outdated drivers	"STOP 0x0000000A IRQL_NOT_LESS_OR_EQUAL"
General Protection Fault	Windows 98/Me	Software malfunction, device driver problem, or other cause	"SUWIN caused a General Protection Fault in module SUWIN.EXE."
Invalid Page Fault	Windows 98/Me/XP	Shortage of RAM, shortage of hard drive space for swap file, memory management misconfiguration, or software errors	"TVX98 caused an invalid page fault in module MSVCRT20.dll."
Kernel32.dll	Windows 98/Me/XP	Damaged swap file, file allocation damage, damaged password list, damaged or outdated video drivers, damaged Registry, hardware problems, overlocked CPU, misconfigured BIOS, damaged control panel (CPL) file, or other	"WINNT32 caused an invalid page fault in module KERNEL32.DLL at 0187.bf9db61."
Invalid VxD Dynamic Link Call	Windows 98/Me	Incompatibility between device driver versions or a damaged or missing driver	"Invalid VxD dynamic link call from vdata95(01)+00012474 to device '0028', service 800a. Your Windows configuration is invalid. Run setup again to correct this problem."

trace. The good news is that since the release of WinXP, Microsoft has identified the most likely culprits, so let's take a look at them.

You might encounter this error if your WinXP CD-ROM is scratched, smudged, or dirty. Clean your CD-ROM with a soft cloth by lightly rubbing from the center hole to the outer edge, all the way around the disc. It's also possible that your CD-ROM drive isn't working properly or the disc is vibrating too much for the laser to accurately read the data. Older drives are particularly suspect in this area. If you think your drive is causing the trouble, make sure it's operating properly in your current Windows OS and that it's running on updated drivers. If you don't have a Windows OS installed, try installing Win98 or WinMe (if available), and once installed, check that the drive is working properly by reading data and running programs from other discs.

With the plethora of different drive types available today (CD-ROM, CD-RW [CD-rewritable], DVD, etc.), many of us have more than one drive installed. If you do, it's possible that Windows is trying to access the setup information on the wrong drive.

To disable the spare drive, open Device Manager in your current Windows OS by right-clicking My Computer, clicking Properties, and then clicking Device Manager. Locate the drive you'd like to disable and click the option for disabling the drive within the hardware profile. You can also physically disconnect the drive (after shutting off and unplugging the computer, as well as taking other precautions previously discussed) if you want to be certain that Windows won't override your settings.

If you've disabled the drive, but you're still receiving the error, ensure that your disc drive is using PIO (Processor Input/Output) mode instead of Ultra DMA, which could be moving the CD data too quickly for your computer to properly analyze it. When the initial bootstrap screen appears on your monitor, press DELETE, ESC, or F1 to enter the BIOS (Basic Input/Output System). Page through the BIOS screens until you see a setting for PIO and DMA. Ensure your drive is using PIO. You can sometimes change this setting in an existing Windows installation (via Device Manager).

You might also run into problems if your PC is overclocked, although this is unlikely if your memory isn't running beyond its normal specification. For instance, if you're using PC100 RAM (a type of RAM) and you have the front-side bus on your motherboard set for 112MHz, the taxed memory could be causing decoding errors when

the system is extracting files from your WinXP setup disc. Set your memory to run at its default speed, and while you're at it, set the front-side bus at its default speed. Finally, if you're using an unlocked processor, set the processor at its default speed, too. Try the installation/upgrade process again.

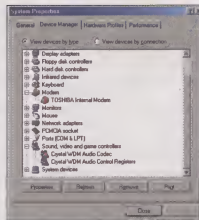
Still having setup problems? Your RAM might be at fault, even if it's not running beyond its specifications. If you're using mismatched RAM (such as EDO and non-EDO RAM or RAM of varying speeds), you could encounter decoding problems. Make sure that you're using RAM of the same type and speed during your setup; you can always put the other RAM in later (then again, if you're receiving errors during setup, you'll probably run into problems down the road, so consider matching the type and speed of all of your RAM).

If you're still looking for more answers, you're probably pulling out your hair by now. Luckily, there are two more possibilities. If you're using a third-party memory manager, disable or uninstall it. In addition, run a full virus scan (make sure your virus definitions are updated beforehand) because a virus could be the source of WinXP's setup problems.

Fatal Error: Setup Cannot Continue (WinXP). If you're upgrading to WinXP from Win98 or WinMe, you might receive the following error message: "Fatal Error: Setup Cannot Continue. Please Contact Microsoft Technical Support. (Error 3E6h)"

Before you pick up the phone, consider a few different possibilities. If you have System Restore Remover Pro by Definition Software on your system, go back into your existing OS and uninstall it. Likewise, if you have Intuit QuickBooks, uninstall it. Retry the WinXP installation.

If you receive the same error, rename the Config.sys and Autoexec.bat files and try again. To change the file names, locate the files on the drive where your existing Windows OS is installed (typically, it's C:), right-click each file, select Rename, and change the names to Config1.sys and Autoexec1.bat. Restart the WinXP installation process.



Devices sporting a red X or yellow exclamation point (!) in the Device Manager are likely culprits when it comes to troubleshooting your system.

Still having problems? Remove any nonessential external hardware, such as USB (Universal Serial Bus) devices, scanners, speakers, digital cameras, and printers. Try again.

If you still encounter the error message, perform a clean boot and then install WinXP. To perform a clean boot, see the directions Microsoft provides in its Knowledge Base (<http://support.microsoft.com/search>). Scroll to the bottom of the Searching The Knowledge Base Web

page, and in the field at the bottom of the page, type Q192926 if you have Win98 or type Q267288 if you have WinMe. Click the green arrow, and the page of instructions you need will soon appear on-screen.

Setup Does Not Have Enough Conventional Memory (WinMe). If you're upgrading to WinMe, you might run into the following error message: "Setup does not have enough conventional memory to check your computer's hard disks. You need to free some conventional memory before continuing."

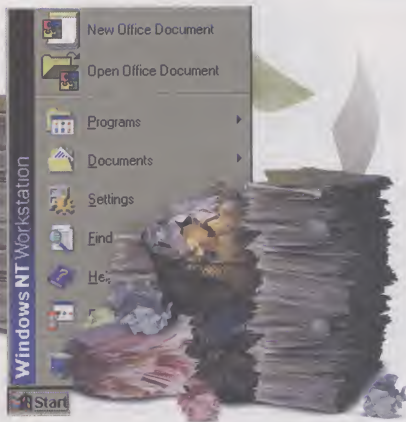
This can happen if the hard drive to which you're installing the OS is marked as a removable drive. To check its status, click Start, Settings, and Control Panel, and then double-click System. On the Device Manager tab, double-click Disk Drives and then double-click the drive onto which you're trying to install WinMe. Within the Settings section, check to see if the Removable checkbox has a check mark. If it does, click it to remove the check mark, click OK, click OK again, and reboot your computer. Restart the installation process.

Get Past The Doom & Gloom. Of course, this is just a small sampling of Windows errors. Still, many have terminology similar to the messages discussed in this article. If you familiarize yourself with basic troubleshooting tactics, chances are good you can easily resolve future problems by checking likely hardware and software culprits. In any case, don't panic when Windows suggests that you start from scratch—there's almost always a better solution. [E]

by Christian Perry

A Fresh Start

Clear The Clutter From Your Start Menu



The Start menu is like the table of contents for your computer. Unlike a book's static table of contents, though, the Start menu can change over time and often becomes too crowded to look organized. And even though you might frequently remove programs from your system, their listings usually remain in the Start menu, along with applications you rarely use and other bits of information that add to the clutter. All of this can make it harder to find what you're looking for. But you don't have to be stuck with a messy Start menu. Here's how to get rid of the chaos.

■ Start Up WinXP. The first step in organizing your Start menu in Windows XP is right-clicking the Start button and clicking Properties. This displays the Taskbar And Start Menu Properties dialog box, with the Start Menu tab on top. Here's where you'll find commands for deleting

shortcuts, enabling drag-and-drop capabilities, and more.

To get started, click the radio button next to Start Menu (not the Classic Start Menu radio button) and click the Customize button on the far right. The next dialog box that appears on-screen displays the General tab on top, which carries some of the more cosmetic options for changing how your Start menu looks. For instance, you can change the size of the icons that appear on the Start menu from large to small by selecting the appropriate radio button.

The General tab also has a Programs section that lets you determine the number of shortcuts you want to display in the Start menu's shortcut area (at the top of the first column of the Start menu). By default, WinXP places the six programs you use the most frequently in the shortcut area, each with its own icon. Although you can't dictate which programs you'd like featured in the shortcut area, you

can change the number of programs featured there. Or you can click the Clear List button to remove all the shortcut menu icons and start from scratch.

Most users access two programs so frequently that WinXP places them on the Start menu automatically, just above the shortcut area. These are icons labeled simply as Internet and E-mail. You can dictate which program shortcut appears under each label, such as whether E-mail refers to Outlook Express or Hotmail. In the Show On Start Menu section of the General tab, select the desired programs from the drop-down menus and click OK to close the dialog box and save your changes.

Now, let's move on to organizing the rest of WinXP's Start menu. Let's start by looking at the items Microsoft places there, such as My Documents, My Pictures, and My Computer. If you find yourself rarely using these items, remove them (removing them from the Start menu does not remove them from your computer).

Once again, open the Customize Start Menu dialog box to access its settings. Choose the Advanced tab and look at the middle section, Start Menu Items. Each of the "My" folders, such as My Documents, has three radio button options: Display As A Link, Display As A Menu, and Don't Display This Item. Choose the latter option to clear it from your Start menu and click OK. If, at a later time, you wish to add any of these items back to the Start menu, simply choose one of the other two options.

To remove most of the other items from the Start menu—specifically those listed under All Programs—you can ignore the Customize Start Menu dialog box. Instead, open the Start menu, select All Programs, and wait a second or two for the program listing to appear. Highlight a program you want to delete, right-click it, and select Delete from the pop-up menu. (If you're doing this for other types of items in the Start menu, you might see a Remove From This List choice in the pop-up menu instead.) Next, follow the instructions for deleting the listing. For example, WinXP might prompt you with a warning stating that removing this listing may affect all users on the computer. Click OK to delete the item.

Adding programs to the WinXP Start menu can be a bit more complicated because there's no easy way to add programs to the All Programs listing. But you can easily add them to the main column of the Start menu, thanks to the new Pin To feature.

First, locate the program you want to add to the Start menu. One way to do this is to open My Computer (via the icon on the Desktop or the Start menu) and browse through the contents of your hard drive. Once you locate the program (and it must be a file, not a folder), right-click it. In the pop-up menu, choose Pin To Start Menu. Now, the next time you click the Start button, the item will display toward the beginning of the list.

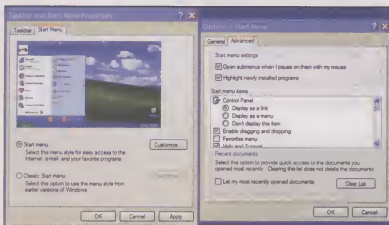
Once you have all the programs you want on the Start menu and you've eliminated the ones you don't want, you're ready to organize them. Make sure you've enabled Windows' drag-and-drop feature by opening the Customize Start Menu dialog box, choosing the Advanced tab, and placing a check mark in the checkbox next to Enable Dragging And Dropping in the Start Menu Items list. After doing so, you can move items in the shortcuts list or All Programs list to arrange them alphabetically or by any other criterion you choose.

The Start menu in WinXP has one more feature we'd like to mention: the ability to revert to the classic style of previous Windows versions. To change your Start menu in this way, open the Taskbar And Start Menu Properties dialog box again, choose the Start Menu tab, select the Classic Start Menu radio button, and click OK. If you prefer this type of Start menu, read on for its customization tips.

■ The Classic Face Of Win98 & WinMe.

The key to organizing the classic Start menu lies in its Properties dialog box, which is called Taskbar Properties in Windows 98 and Taskbar And Start Menu Properties in Windows Me. To access this dialog box, click Start, Settings, and Taskbar And Start Menu (actually called Taskbar & Start Menu in Win98). In Win98, users need to click the Start Menu Programs tab to find the settings they need. In WinMe, users need to click the Advanced tab.

Adding a program listing to the classic Start menu is a simple process. Regardless of whether you're using the Properties dialog box of Win98 or WinMe, you'll need to begin by clicking the Add button. Windows will prompt you to enter the location of the program you



Windows XP users can change numerous Start menu settings with the Customize Start Menu dialog box, accessed through the Taskbar And Start Menu Properties dialog box.

want to add. Click the Browse button, locate the file on your hard drive, highlight it, and click Open. Click Next, and then click the menu or submenu where you want the program listing to appear. (You can also create a new submenu for the program by clicking the New Folder button and following the prompts.) Click Next. Now it's time to name the program. Click Finish (or Next; adding some program listings in WinMe requires you to choose an icon before this last step), and the item will appear on the Start menu.

Removing the clutter from your Start menu is one of the easiest ways to clean it up. For most items, you can simply right-click the item and choose Delete from the pop-up menu. If you use this method to delete a folder, remember that you are deleting all the shortcuts within that folder. Also, keep in mind that if you're deleting an item from the Start menu, you're merely deleting the shortcut that points to it; you're not deleting the application from your computer. By the way, you can also rename items in the Start menu by selecting Rename from the same pop-up menu we just mentioned.

In addition, Windows lets you sort items in your classic Start menu. Win98 users should be able to use the drag-and-drop feature automatically to click any item and drag it to another spot within the Start menu. WinMe users might need to enable

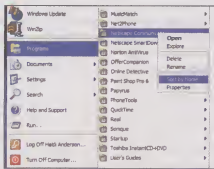
from the pop-up menu.

Another option is to create new submenus within the Programs menu and drag and drop items into these submenus. To create a new menu in WinMe, click Start, Settings, and Taskbar And Start Menu. Choose the Advanced tab, and then click the Advanced button. Win98 users can follow the same directions, except they'll need to click the Advanced button on the Start Menu Programs tab.

When the Windows Explorer window opens (Win98 users will see the Start menu folder highlighted), expand the hierarchical tree in the left pane by clicking the plus signs (+), and then click the folder where you want the new submenu to appear. Open the File menu above, select New, and then click Folder. Type a name for the folder, press ENTER on your keyboard, and then close the window. You can then drag and drop items into this new folder.

■ From Start To Finish. Remember:

No matter whether you're using WinXP or an earlier version of Windows, you don't have to live with the default Start menu as it's presented to you. Make a few simple customizations and incorporate some sensible organization, and each computing session will get off to a better start. **IS**



The Sort By Name option lets you alphabetize items in the classic Start menu.

by Heidi V. Anderson

Time To Wake Up

Instruct Your Computer To Exit Its Power-Saving Mode



We've all had mornings when we'd rather stay in bed. And although this might be fine for humans, it's not really behavior we'd like our computers to exhibit. Unfortunately, the different states of Windows' APM (Advanced Power Management) are known to get stuck in a seemingly deep sleep on occasion. The good news is that if you're having trouble waking your computer after it enters Standby, Suspend, or Hibernate mode, you can probably fix it so it won't happen again.

Windows lets you configure your computer so it conserves energy and decreases wear on certain hardware components. For example, you can set Windows to turn off your monitor and hard drives after a certain period of inactivity. Or you can set Windows to initiate Suspend or Hibernate modes that enter the entire system into lower levels of power consumption. But due to hardware and BIOS (Basic Input/Output System) problems, these power-saving modes don't always work flawlessly.

For instance, although you can typically stop Standby mode by moving your mouse or

clicking a keyboard key, you might continue to see a blank screen or no hard drive activity (and hear no computer activity at all, other than the whirring fans). Luckily, there are some usual suspects when it comes to APM troubleshooting, so if you can't seem to wake your computer from a deep sleep, try the following steps.

■ **Check APM in Your BIOS.** Every BIOS handles power management in its own way, so if you're having trouble waking your computer, it's possible that your BIOS is trying to override any power settings you've set in Windows. With this in mind, it's a good idea to check the APM settings in your BIOS.

To do so, enter the BIOS by pressing the F1, DELETE, or ESC keys on your keyboard when the initial boot screen appears on your monitor (if none of these keys summon the BIOS, check your motherboard manual or motherboard manufacturer's Web site). Of course, this step requires a reboot if your system is currently running.

Depending on the age of your BIOS, you might see a menu that offers access to several

screens of information. Page through these screens (without changing any values) until you find an option for APM. Make sure this option is set to Enable or On. If you see similar options in addition to the APM option, make sure that they're set to Disabled or Off to ensure that Windows has full control of your computer's power management. If any of these options (aside from the main APM option) are enabled, the BIOS might try to override any settings you've configured in Windows, and this could prevent your system from successfully waking.

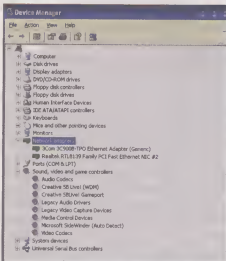
If you do make any changes in your BIOS, make sure you write them down in case you need to revert to the original settings later. Save your settings upon exiting the BIOS, and the system should automatically reboot.

■ **Update Your Video Driver.** Outdated video drivers can wreak havoc on system stability in a variety of ways, such as preventing your system from resuming from Standby mode. Windows is rather particular when it comes to proper drivers, so it's important to ensure your video drivers are up to date.

To do so, click Start, choose Settings, click Control Panel, and double-click System (in Windows XP, you may need to initially choose Performance And Maintenance in your Control Panel or it may be directly accessible from the Start menu, depending on your configuration). Click the Device Manager tab, double-click Display Adapters, right-click your display adapter, and click Properties. Click the Driver tab, and then click Update Driver. If you want Windows to automatically find a new driver for you, click Automatic Search For A Better Driver in Windows 98 and Windows Me, or click Install The Software Automatically in WinXP. If you've already downloaded an updated driver from your manufacturer's Web site (which is generally the best idea), click Specify The Location Of The Driver in Win98 and WinMe, or click Install From A List Or Specific Location in WinXP.

If you asked Windows to find an updated driver, it may return with a message indicating that the best available driver is already in use and no updating is necessary. This isn't typically the complete truth, however, as Windows only searches for drivers on any media connected to your computer (including hard drives). WinXP will search its online database in addition to media, but in many cases, drivers from Microsoft's database won't be as up to date as drivers available from your manufacturer.

Therefore, it's a good idea to grab a driver from your manufacturer's site and install it



Disabling nonessential hardware devices, such as network adapters and your sound card, can help to reveal why Windows refuses to budge from power-saving modes.

instead (another benefit with this process is that these drivers often come with instructions for installation). Note that if you're using a video card with an NVIDIA chipset, see get drivers directly from <http://www.nvidia.com> instead of your PC manufacturer's site. These drivers are updated often and are typically faster and more stable than proprietary drivers.

Once you install the drivers, Windows will typically require you to reboot. In many cases this process will fix problems relating to Standby mode, but if it doesn't, you might have a problem with another hardware device.

■ **Disable Nonessential Hardware.** If your BIOS or video driver aren't to blame for your power problems, there's a good chance that another device driver is causing the trouble. The best way to find the potential culprit is to disable nonessential hardware devices one by one.

Click Start, choose Settings, click Control Panel, and double-click System (again, in WinXP, choose Performance And Maintenance in your Control Panel first or access the Control Panel directly from the Start menu). Click the Device Manager tab and look for devices that you can safely disable (but still be able to run your computer). For instance, you can disable your sound card, network adapter, scanner, Zip drive, and printer, but remember to disable each device one at a time.

To disable the device in Win98 and WinMe, right-click the device within the Device Manager dialog box, and under the General tab, click Disable In This Hardware Profile.

Click OK to close this dialog box and then do the same with any other open Device Manager dialog boxes. Restart your computer.

In WinXP, follow the same process, but under the General tab, select Do Not Use This Device (Disable) under Device Usage. When your computer restarts, either enable the Standby mode or wait for your monitor or hard drive to turn off (you can change the time values for these if you don't want to wait).

If you're experiencing the problem in Suspend or Hibernation mode, you'll have to place the computer in either of these states.

After trying this, if your PC still doesn't wake up, return to the Device Manager dialog box and enable the device you just disabled by either deselecting the Disable In This Hardware Profile checkbox in Win98 and WinMe or selecting Use This Device (Enable) in WinXP. Find another nonessential device and disable it by following the same steps.

Use this process with all such devices until you are able to successfully exit Standby or another power-saving mode. If you do find a device that, when disabled, helps your system wake up, you'll need to update the device's driver (see the aforementioned steps for updating video drivers; the same process applies for other hardware devices). You should be aware that not all devices are fully compatible with different Windows OSes (operating systems). This is particularly true with WinXP because it's still relatively new. If you find that the only available updated driver for your hardware is causing your power problem, you might have to either live without the APM options or buy a different hardware device (of course, choose one that's compatible).

■ **Update Your BIOS.** If your PC still doesn't wake after trying the aforementioned fixes, it's possible that your BIOS may need updating. Depending on the age of your motherboard, your BIOS may be flash-upgradeable, which means that you can upgrade it using software. If it isn't flash-upgradeable, you might need to replace the actual BIOS chip(s), or you might even need

to replace the motherboard if you want a newer BIOS.

Fortunately, most modern systems are flash-upgradeable. If your system was built by a major manufacturer (such as Dell, Compaq, etc.), you can typically find BIOS updates to match your system, but keep in mind that your BIOS may not need an update to begin with. If your manufacturer doesn't provide support or if you're using a home-built system, determine what the make and model is of your motherboard and check the motherboard manufacturer's site for BIOS updates.

The updates are usually in the form of a program that decompresses files onto floppy diskettes, and these diskettes are used to complete the installation outside of Windows after a reboot. Before you proceed, enter your current BIOS and write down all of your settings so you can duplicate them in the updated BIOS. Also, it's a good idea to back up your files to removable media (just in case). Finally, ensure that you have the correct BIOS update and all of the directions, and once you do, follow the directions carefully. Improperly flashing your BIOS can render your system unusable, and even though it's possible to recover from a failed upgrade, the process can be complicated.

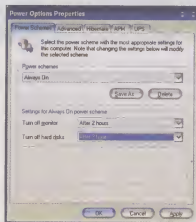
For more detailed information about BIOS updates, see PC Mechanic's Updating BIOS page (<http://www.pcmec.com/show/bios/81>). In addition, if you're having trouble booting your computer after updating your BIOS, use someone else's computer to visit BadFlash.com (<http://www.badflash.com>).

■ Happy Slumbers.

Waking Windows when it doesn't want to wake can be frustrating. However, an easy probe into the BIOS and hardware configuration settings usually solves the problem and

lets you use APM's power options seamlessly. So the next time you're staring at a blank screen when you expected a lively, alert window, don't panic; it might just be an uncooperative Windows trying to snag a few extra winks. **16**

by Christian Perry



If Windows isn't waking after you configured it to shut off your monitor and/or hard drives after a period of inactivity, you can check the BIOS (Basic Input/Output System) and hardware for possible culprits.

Copy Infringements

I Copied A Program To A CD-R, But It Won't Work When I Copy It Back



change the read-only status easily by modifying each file's properties. To do so, open

Windows Explorer by right-clicking the My Computer icon on the Desktop and choosing Explore. Navigate to the folder that contains your copied file(s), right-click the copied file, and then choose Properties. Deselect the Read-only checkbox and click OK. Repeat this action with any other copied files.

You can also select all of the files copied, right-click over the entire group, and similarly change the files' read-only status by doing so all at once. However, if there are files within subdirectories, the read-only property on those files will be unaffected.

Change it with the command prompt.

You can easily remove read-only flags by using a command at the command prompt. First, copy files from your CD to a folder, such as C:\WINDOWS\DESKTOP\NEW. Next, open a command prompt window by clicking Start, Run, and typing command in the dialog box. Then, navigate to the folder that contains the copied files by using the Change Directory command. So, for our example, we typed `cd c:\windows\desktop\new` (because c is the letter for our hard drive). Finally, type the following command at that prompt: `attrib -r * /s`

Copy it with the command prompt.

If you copy the files while within a DOS or command prompt environment, the read-only attribute will not copy to the hard drive. To use this process, click Start, Run, and then type command in the field provided. Next, use the COPY command to copy files and/or folders from your CD-R to your hard drive without enabling the read-only attribute.

To demonstrate what we're referring to, we'll give you an example. By typing the following command at the prompt, all files in the Textfiles folder on the CD-R will copy to the

New folder on the Desktop: copy e:\textfiles c:\windows\desktop\new

Zip 'em up. You can use a compression program, such as PKZIP from PKWARE (\$26; <http://www.pkware.com>) or WinZip from WinZip Computing (\$29; <http://www.winzip.com>), to avoid the read-only attribute. Simply compress the file(s) into a ZIP format and burn it to the disc.

When copied back to your hard drive, those compressed files will retain their modifiable format. This method can be cumbersome, especially if you're dealing with a large number of files and only plan to retrieve some of them from the CD.

Use the ReadOnly program. Sente's ReadOnly program (free; <http://www.sente.co.uk/downloads.htm>) automates the process of read-only elimination. With this utility, you can change the read-only attribute of multiple files, even those in subfolders. Use the Change Folder button to navigate to the folder on your hard drive where you copied your files. Ensure that Sente's Read Only checkbox is not selected (by default, there shouldn't be a check mark), and if you have subfolders within this folder, click the Subfolders checkbox to remove the read-only status from files within those folders.

When you click the Count Files button, the utility counts all of the files and folders within the current folder. Click Apply to change the status of all selected files.

A word of warning: Because this utility automates the read-only process, a careless mistake can transform an entire drive into read-only status. If this happens on the drive where your OS is installed, you can cripple the drive so much that you may not be able to boot your computer the next time you try to.

If you accidentally modify the read-only status on all the files in a folder or drive that you didn't want to modify, use ReadOnly to clear the attribute (but remember: some files that were read-only before the change will now be modifiable). To avoid this problem altogether, make sure you select the proper folder before applying the changes. In fact, it's even a good idea to create a new folder just for your copied files.

Take Action. As you can see, you can't change the behavior that causes the read-only status for copied files and programs, but you can easily remedy the problem by using one of the methods we mentioned. If you're not sure which one will work best for you, try several. **18**

by Christian Perry

If you regularly swap files between CD-Rs (CD-recordables) and your hard drive(s), then you're probably familiar with a Windows annoyance particular to that process: the addition of the read-only attribute.

Files and programs copied from a CD-R to your hard drive receive read-only attributes, meaning that you can't modify them, and you may not be able to run programs copied in this manner. When files and programs are copied to a CD-R, they receive a read-only status because they can't be modified on the disc. Generally you can modify files when they reside on a hard drive, but when they're flagged as read-only files after you copy them to the hard drive, it's a hassle to try and use those files and programs the way that you want.

Fortunately, there are several workarounds to solve this problem. Each varies in its complexity and convenience, so you may find that one of these methods works better for your situation than others. One note before we move on: If you're using Windows XP, you're in luck because this OS (operating system) removes the read-only attribute from files copied from a CD-R to a hard drive. Now let's look at potential solutions for Windows 98 and Windows Me users.

Change files one by one. If you're copying only a small number of files, you can

Shutdown Snags

What To Do When Windows Won't Say Good-bye

Ever get the feeling Windows enjoys your presence? You might get that feeling when it refuses to leave as you try to shut down your computer. Unfortunately, when Windows stops responding at shutdown, one of many possible hardware or software conflicts is at the root of the problem; it's not a miraculous display of cyber-affection.

Just like many aspects of Windows, the shutdown process isn't always a smooth one. Although some of us are lucky and experience no problems turning off our computers, others must stand by and wait seemingly forever for Windows to terminate; and this wait typically ends in the exasperating thrust of the power button or yank of a power cord. Actually fixing the problem isn't always much fun, either. Unlike the diagnoses of many other Windows problems, troubleshooting shutdown issues can be a difficult process of trial and error. This article shows you not only where to look for the problem, but also how to fix it once you find it.

The vast majority of shutdown problems occur in Windows 98, Windows 98 Second Edition, and Windows Me; however, even within those similar OSes (operating systems), quirks reside in each that may not appear in the others. Although a troubleshooting method might be mentioned here for Win98 only, for example, you might find that the method works equally well when tracking your problem in WinMe or Windows XP. Again, the area of potential problems you're targeting is enormous, so be prepared to attack from multiple angles.

■ **Fast Shutdown? Not Necessarily.** When you shut down Win98, the OS automatically

uninitializes all device drivers. However, this takes time, which is why the OS includes a feature called Fast Shutdown. With this feature, this OS doesn't uninitialize drivers, which saves time, but it can also hang your system. So much for a fast shutdown, eh?

Because Fast Shutdown is active by default, try disabling it via the System Configuration Utility if you're encountering problems. To get there, open the Start menu, click Run, and type `msconfig` in the field provided. Click Advanced on the General tab, and then select the Disable Fast Shutdown checkbox. Click OK to confirm the changes and restart your computer when prompted.

If the computer hangs again the next time you shut down, APM (Advanced Power Management)—or the lack of it—could be the culprit. To see if it is, right-click My Computer on the Desktop, select Properties, and click the Device Manager tab. Double-click System Devices to expand it, then double-click Advanced Power Management in the device list. On the Settings tab, select both the Force APM 1.0 Mode and Disable Power Status Polling checkboxes. If

these settings are already selected, deselect them. Click OK to confirm the settings, and restart your computer. If it hangs again during shutdown, return APM to its original settings.

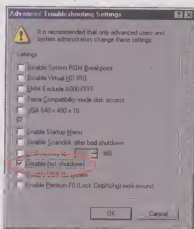
■ **Other Culprits.** Do you have Windows configured to play a sound when you shut down your computer? If so, the sound file could be damaged. To find out if it is, click Start, Settings, and Control Panel, and double-click Sounds (or Sounds and Multimedia in WinMe). Click the Exit Windows sound event and write down the name and location of the

sound file (by clicking Browse to see which folder it resides in). Select None in the Name field, click OK, and restart your computer. If the computer shuts down properly, find the file you previously used for the shutdown sound and delete it. If the computer hangs again, reboot, enter the Sounds control panel, and place the sound file there again as your Exit Windows sound.

Try cleaning out the files in some of your temporary folders. These folders can become extremely full, and in many cases, the files stored there don't help system performance whatsoever. It's a good idea to clean the folders, one at a time, and then try to shut down your computer after each cleaning session.

First, manually delete the files in your C:\WINDOWS\TEMP folder (or wherever your Windows folder resides) and restart your computer. Note that on rare occasions, deleting files from your C:\WINDOWS\TEMP folder can cause system stability problems; however, the files usually stored there are remnants of sloppy application installation utilities that should have cleaned up after themselves but didn't. Because of this, it's generally safe to clear the C:\WINDOWS\TEMP folder on a regular basis, and you might discover that this solves your shutdown problem.

If the problem continues, repeat the process in the C:\WINDOWS\TEMPORARY INTERNET FILES folder. If this folder was the culprit, you can limit its size to prevent a shutdown problem in the future. To do this, change its settings in Microsoft Internet Explorer by opening the Tools menu, clicking Internet Options, choosing the General tab, and clicking the Settings button in the Temporary Internet Files area. When the Settings dialog box opens, move the slider to decrease the amount of hard drive space used for the Temporary Internet Files folder.



Amazingly, the Fast Shutdown feature of Windows might cause your computer to never shut down. By disabling it in the System Configuration Utility, you can determine if it's causing your shutdown problems.

Still no luck? If you're using Symantec's Norton AntiVirus application with the Auto-Protect feature enabled, try disabling Auto-Protect and shut down your computer. If it doesn't hang, go to <http://www.symantec.com/downloads> for the most recent patch or upgrade.

Speaking of patches, if you're using Win98SE, Microsoft has released the Windows 98 Second Edition Shutdown Supplement, a patch that addresses several shutdown issues with specific hardware and software configurations. More information and a download link can be found online at Knowledge Base (<http://support.microsoft.com/default.aspx>) by selecting Windows 98 from the drop-down menu on the left, typing Q239887 in the field below, and clicking the green arrow to begin the search.

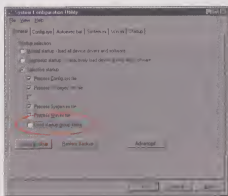
If you're using WinXP and it hangs at the Saving Your Settings screen during shutdown, you can download a patch from the Windows Update site (<http://windowsupdate.microsoft.com>) that addresses the issue. WinXP users may also have shutdown problems if they're using a Creative Labs Sound Blaster Live! sound card, particularly if they receive an End Task window during shutdown that never seems to go away. In this case, visit <http://www.creative.com> for updated drivers, and be sure to follow the directions closely because you'll need to fully uninstall any existing drivers.

■ Pull Out The Big Guns. If your computer is still hanging at shutdown after trying all of the suggestions we just provided, it's time to pull out the more powerful troubleshooting aids. If you recently installed any hardware or software, try uninstalling it and restarting your computer. If the shutdown is successful, the new hardware may have been installed incorrectly, so try reinstalling it and installing any applicable software. Alternately, if a software application was the problem, it's possible that it's not fully compatible with your OS, so check the software manufacturer's Web site for a patch or upgrade. And while you're there, check any support FAQs (frequently asked questions) or forums for specific details about your problem.

Next, restart your computer in Safe Mode and then shut down. If you still encounter shutdown trouble, it's possible that Windows is conflicting with your computer's BIOS (Basic Input/Output System). Check with your motherboard/BIOS manufacturer to determine if a BIOS upgrade is necessary. For more information about your BIOS and BIOS upgrades, visit Wim's BIOS Web site (<http://www.wimbios.com>) or

Motherboards.org (<http://www.motherboards.org/biosup.html>). Microsoft has a list of contact information for third-party hardware and software vendors at one of its Product Support Services pages (<http://support.microsoft.com/default.aspx?scid=kb-en-us;Q65416>).

In addition, programs automatically loaded from the Startup folder have been known to wreak havoc from time to time. To see if any are causing your shutdown problems, launch the System Configuration Utility again. Choose the General tab, click Selective Startup, and deselect the Load Startup Group Items checkbox. Restart the computer (or simply restart Windows), and if the computer shuts down smoothly, you'll know one of the Startup programs is to blame. From this point on, you need to do a selective startup to see



Depending on your configuration, certain programs might load automatically at startup. If you think one of these programs could be causing your shutdown problems, prevent it from loading via the System Configuration Utility and see what happens.

exactly which program is causing the trouble. In the System Configuration Utility dialog box, click the Startup tab, remove the check mark from the first item in the list, and restart your computer. Repeat this process until you find out which program is hanging the system (be sure to place a check mark back in front of programs that aren't causing problems).

You can also use the System Configuration Utility to troubleshoot problems with the System.ini and Win.ini files. Under the System.ini tab, locate the [386Enh] section, remove the check mark next to each item (one at a time) that begins with DEVICE= and ends with .386, and restart your computer. If your computer shuts down successfully after disabling one of these items, you might need to update a VxD (virtual device driver). Contact the manufacturer of the device that uses the driver for an update.

On the other hand, if you didn't find problems in the System.ini section, choose the Win.ini tab and remove the check mark next to any items (again, one at a time) that begin with LOAD= or RUN=, and restart your computer. If Windows shuts down properly after you disable one of these items, determine which program the deselected item refers to and check for any program patches or updates you can install.

■ Check Device Drivers. A similar hit-or-miss troubleshooting tactic is to disable hardware device drivers. To do so, open your trusty Device Manager again. Double-click a device type (such as Sound, Video And Game Controllers), double-click a device within the category, and click Properties. Select the Disable In This Hardware Profile checkbox and restart the computer. If the computer shuts down successfully, you'll need to check for updated drivers you can install for the hardware device. You also can perform this troubleshooting technique with any of the following device categories: Floppy Disk Controllers, Hard Disk Controllers, Keyboard, Mouse, Network Adapters, Ports, PCMCIA Sockets, and SCSI Controllers.

To test your video adapter, click Advanced in the System Configuration Utility dialog box. Select the VGA 640x480x16 checkbox and click OK. Or, you can also test your video adapter by changing your computer's Video mode to Standard VGA. Click Start, Settings, and Control Panel, and double-click Display. Under the Settings tab, click Advanced, and then click the Change button on the Adapter tab. Click Specify The Location Of The Driver (for WinMe), click Next, select Display A List Of All The Drivers In A Specific Location, and click Next. After that, click Show All Hardware and select Standard Display Types in the Manufacturers area. Finally, click Standard Display Adapter (VGA) in the Models area and click Next. Confirm any changes and restart your computer when prompted. If this solves the shutdown problem, you'll need to obtain an updated video driver from your video card manufacturer.

■ Inspect The Bootlog For Clues. You might find evidence of your shutdown trouble in the Bootlog.prv file. This startup log file is usually hidden in the root folder of your C: drive, so if your system is configured to hide system files, you'll have to do a little digging. Double-click My Computer on the Desktop, open the Tools menu, click Folder Options,

and then click the View tab. Deselect the Hide Protected Operating System Files checkbox, and then click Yes to confirm your change.

The Bootlog.prv file should now be visible on your C: drive. If it isn't, you can create a new one. Shut down your computer (and if it hangs as usual, press the power button to power off your computer; if you don't have a power button, unplug your computer). After about 15 seconds, turn on your computer and hold down the CTRL key, which will display the Startup menu. Choose Logged (BOOTLOG.TXT) and press ENTER on your keyboard. When Windows starts again, restart the computer.

After Windows restarts, open Bootlog.prv with WordPad, Notepad, or another text editor. Look at the bottom of the file, particularly for any "Terminate—" entries, which can give you an indication of what's happening during your shutdown. During a successful shutdown, each "Terminate—" entry will have a matching "EndTerminate—" entry, and the last line in the file will be EndTerminate-Kernel. Because your system hangs at shutdown, you might see a different last line.

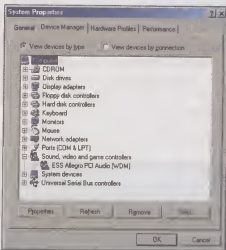
If the last line is Terminate-Query Drivers, you might have a memory manager problem, defective memory, or damaged files. If you're not able to target the source of the problem, a Windows reinstall might be necessary. Terminate-Reset Display could indicate an outdated video display driver, so download the most recent version from your manufacturer's Web site to update the video driver. Or, Terminate-Unload Network indicates a possible conflict with a real-mode network driver in the Config.sys file. Again, check your hardware for possible driver updates.

The line Terminate-RTT could signal timer-related issues with your sound card or an older mouse driver, so check for driver updates for these devices. Finally, if you see the line Terminate-Win32, which indicates that a program is not shutting down properly when Windows attempts to shut down, you need to do some additional troubleshooting. Close all programs before shutting down your computer, and if this leads to a smooth shutdown, leave one program open at a time and shut down Windows to determine which program is causing your system to hang.

■ **Dig Even Deeper.** The issues outlined thus far are relatively common when it comes to shutdown problems. However, you might be one of the unlucky few who experiences a more difficult-to-diagnose problem that typical

troubleshooting can't solve. Let's look at some less-frequent problems that could cause your system to stop responding at shutdown.

IRQ (interrupt request line) steering lets several PCI (Peripheral Component Interconnect) devices in your computer share the same IRQ. But if your BIOS isn't fully compatible with IRQ steering, your computer



Disabling devices such as sound cards and network adapters in Device Manager can help to isolate problem hardware and device drivers.

could have problems shutting down. Disable it by entering the Device Manager, double-clicking System Devices, double-clicking PCI Bus, clicking the IRQ Steering tab, and then deselecting the Use IRQ Steering checkbox. Confirm the changes and restart your computer. If it shuts down successfully, you may need to change your BIOS configuration (consult your motherboard manual) or check with your motherboard/BIOS manufacturer for a possible update.

Another BIOS problem you could encounter is when Windows and the BIOS aren't communicating properly with hardware during shutdown. If you're using Win98SE, you can configure it to bypass BIOS plug-and-play settings and communicate directly with the hardware. To do so, restart your computer and hold the CTRL key until you reach the Startup menu. Select Command Prompt Only, and type `cd\windows\system` at the command prompt. Next, type `rename bios.vxd bios.old`. Restart your computer and try to shut down Windows. If the shutdown process is successful, your BIOS is to blame.

You can also check for a Windows-BIOS conflict by disabling the NVRAM/ESCD Updates feature. To do so, double-click System Devices

in the Device Manager, and then double-click Plug And Play BIOS. Select the Disable NVRAM/ESCD Updates checkbox on the Settings tab. Confirm any changes and restart your computer.

In Win98 and Win98SE, your system might hang when you try to shut down while connected to several mapped network drives. In Win98SE, this occurs because a WM_DEVICECHANGE message is sent to all top-level windows to inform each window of a DBT_DEVICEMOVECOMPLETE event, and if a window doesn't respond to the message, the system stops responding. In Win98, this could occur (albeit rarely) when you update the video driver and restart Windows, when you change the display font size and restart Windows, or when a 16-bit application confronts a particular Win16 API (application program interface) error.

In any case, Microsoft released a supported fix for the Win98SE problem, which you'll find by visiting Product Support Services (<http://support.microsoft.com/directory/overview.asp>). If you suspect this problem is causing your shutdown problems in Win98, unfortunately there isn't a fix. To work around the error, disconnect all mapped network drives before you shut down.

It has also been reported that Windows can stop responding at shutdown if your BIOS expects the IRQ 12 setting to use a PS/2 mouse, but a software-configurable hardware device is using it instead. To determine if this is happening in your system, reserve IRQ 12 in the Device Manager by double-clicking the Computer entry, clicking the Reserve Resources tab, clicking the Interrupt Request (IRQ) option, and then clicking Add. Enter a value of 12 in the Value field, confirm any changes, and restart your computer. If Windows shuts down properly, contact your motherboard/BIOS manufacturer for a BIOS update.

■ **Happy Hunting.** Hunting for the answer to your shutdown blues can initially seem like a troublesome annoyance. But with the proper ammunition, you'll likely have your system operating smoothly in no time. Remember that although some fixes are documented only for certain OSes, the same concepts typically apply across all Windows platforms. Be creative when stalking your shutdown prey, and you might be surprised when you find yourself having a little fun in the process. [E]

by Christian Perry

Files In Hiding

Why Can't I See All Of My Files?

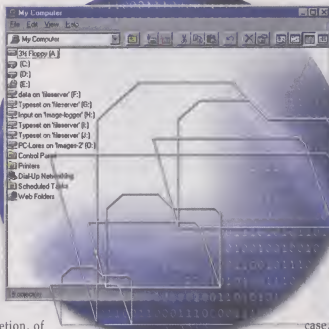
Out of sight, out of mind. That's the way some things ought to be, especially if their presence might lead to problematic situations. Parents know this, so they put breakables and dangerous objects away from the reach of their curious children. Employers also know this, so they store proprietary information where disgruntled workers cannot see it. And Microsoft knows this, so it designed the Windows OSes (operating systems) to hide key files and folders safely out of sight.

■ **A Reason To Hide.** Why hide some of the more important files and folders on your system? To protect them from accidental deletion, of course. After all, what you can't see, you can't delete from the hard drive. Hidden files do not appear in My Computer or Windows Explorer, nor do they show up when using the OS' Search utility.

Windows hides several files and folders by default, including many of the system files that are crucial to PC performance. Windows also hides the files and folders the Windows System Restore tool and various uninstall utilities preserve just in case you decide to restore your system to a prior operational state.

To get an idea of how many files and folders Windows hides from your view, open My Computer and double-click the Windows drive (the drive where Windows is installed) so you can see all of its contents. Next, open the Tools menu (View menu in Windows 98) and click Folder Options. In the resulting dialog box, click the View tab to see a list of Advanced Settings. Select the Show Hidden Files And Folders option (in Win98, choose the Show All Files option), and click the OK button to save the change.

You now will see several folders and files, such as the _RESTORE and System Volume Information folders and the Command.com and Io.sys files, you didn't see before. These previously hidden files and folders look



somewhat faded so you can distinguish them from those that are not hidden by default. To hide the files and folders again, simply return to the View tab of the Folder Options dialog box and select the Do Not Show Hidden Files And Folders option.

The OS also gives you the option of hiding any other files or folders you would like to keep out of sight. All you have to do is open My Computer, find the file or folder you want to hide, right-click it, and select Properties from the pop-up menu. At the bottom of the resulting dialog box, select the Hidden attribute checkbox, and click OK. If you choose to hide a folder, Windows will present a confirmation message on-screen asking whether you want to hide only the selected folder or all of the related subfolders and files. Make your selection (either choice is fine) and click OK.

We suggest hiding files and folders you don't want to delete accidentally, such as the C:\WINDOWS\SYSTEM folder. Although you might be tempted to hide files as a security measure, we discourage you from doing so because the protection offered by such a measure is extremely weak. You're better off investing your time and money on

a genuine security utility, such as a firewall or encryption program.

■ **The Dangers Of Hiding.** Files and folders are not the only things Windows hides by default. It also automatically conceals common file extensions. For example, the OS hides the extensions for text documents, including .TXT, .DOC, and .RTF; graphics files, including .JPG, .BMP, and .TIF; Web files, including .HTML; and system and program files, including .INI, .COM, and .EXE.

Even though this default setting certainly keeps your folders tidy, it also lets crackers disguise their destructive wares as regular documents and images. How? Consider the case of a cracker who creates a program that lets him access all of the files on your PC. If the cracker distributed the program as a file named Virus.exe, you would never open it. But what if the cracker names the program Britney.jpg.exe? In that case, the program appears on your PC as Britney.jpg (remember, Windows automatically hides .EXE file extensions). The cracker hopes that by implying the file is a picture of Britney Spears, you will open the file and set free the invasive code hidden inside.

To a certain extent, you can protect yourself against such deception by directing Windows to display all file extensions. Open the View tab of the Folder Options dialog box again and locate Hide File Extensions For Known File Types (in Windows XP, it's called Hide Extensions For Known File Types). Deselect this option and click OK.

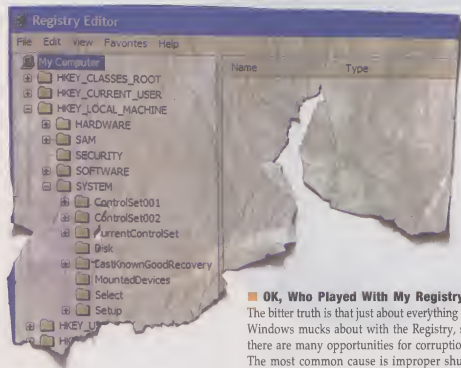
Now, most of the files on your PC will show their true extensions (unfortunately, Windows will not show the .SHS, .PIF, and .LNK extensions even when users deactivate the Hide File Extensions setting).

■ **Seen Or Unseen.** Despite the risk of accidental deletion or cracker invasions, most users should stick with the default hidden file settings. Microsoft designed these settings to maximize protection and minimize inconvenience. And some things truly are better left unseen. [E]

by Jeff Dodd

Ruined Registry

How Did My Registry Get Thrashed & What Can I Do About It?



■ OK, Who Played With My Registry?

The bitter truth is that just about everything in Windows mucks about with the Registry, so there are many opportunities for corruption. The most common cause is improper shutdown. If the system has crashed or rebooted, the Registry file itself may be damaged. During normal operation, Windows keeps the Registry in memory; when the OS shuts down properly, it writes back to the hard drive any changes that have been made in the Registry during that session. Any interruption in this procedure can leave your Registry with incomplete or incorrect entries or with a damaged file.

Also, virtually all installations of new hardware or software make changes to the Registry that can go awry. These additions to your system usually make new entries to the Registry (or alter and delete other entries) in the background during the installation process. So, an interrupted installation can leave your Registry botched or have it looking for files that never got placed on the hard drive. And uninstall routines can be just as troublesome. For instance, some video and audio cards are

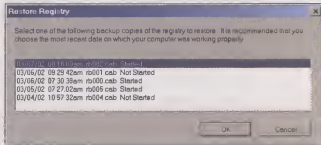
notorious for leaving outdated entries in the Registry that can conflict with a newer card. The symptoms from these sorts of conflicts can be subtler than the usual Registry corruption, but they can be some of the toughest to cure. Your system may work fine generally but may hang when you use some specific video or audio mode because the Registry is calling upon the wrong resource or perhaps on two resources at the same time.

■ **Uninstall & Reinstall.** Because a newly installed piece of hardware or software is the most likely culprit when Registries go bad, the first response to bootup errors is to uninstall and then reinstall the most recent addition to your system. It is important to try uninstalling the program or drivers *before* trying to reload them; doing so may prevent having even more broken entries in your Registry. If the machine won't boot into Windows normally, try booting into Safe Mode (by pressing F5 or F8 at bootup). In either case, go to Start, Programs, Settings, and Control Panel. Click Add/Remove Programs. Highlight the recently added hardware drivers or program and confirm the uninstallation. Always reboot before reinstalling the drivers or software.

■ **Try A Good Cleaning.** Sometimes the Registry isn't broken so much as dirty, cluttered with outdated listings and poorly uninstalled drivers that are in conflict with other resources. Most utilities suites (such as those from Norton or McAfee, but also including some shareware Registry cleaners) include

The Windows Registry is essentially a table of contents for your OS (operating system). It tells Windows which hardware drivers and resources to load at start up, where they are located on your system, and how all of them look and feel on the screen. Unless, of course, things go awry, and your Registry gets damaged. What does a corrupt Windows Registry look like? Well, if you're lucky, it looks like an error message at bootup: "Invalid VxD dynamic link call from ..." or "Fatal exception OE has occurred at variable number in VxD ..."

If you are less than lucky, Windows isn't booting up properly at all, leaving you with a blinking cursor at the DOS screen or a Blue Screen of Death shortly after you boot. If any of these things happens, you may be looking at a corrupted Registry. But wait. Don't reformat that hard drive or reinstall Windows just yet. There are several ways to salvage a ruined Registry or replace it with a backup Registry that functions properly. The first step is figuring out how this happened.



Typing `scannow /restore` from the Run command line will bring you to this menu of backed up Registry files you can reinstate.

tools for deleting old and broken links from the Registry. If your system still boots to Windows or even Safe Mode, using such utilities is the first line of defense; it's an especially effective solution if old video or audio card drivers are lingering in the Registry and conflicting with a newer installation.

The simplest way to back your way out of a Registry problem in WinMe and WinXP is to use the **System Restore** function.

Whatever Registry cleaner you use, be sure to check for compatibility with your version of Windows. Many system utilities for Windows 98 and Windows Me require an upgrade to work properly with Windows XP, which uses a somewhat different Registry structure from earlier Windows versions.

■ Windows' Way Back Machine. The

simplest way to back your way out of a Registry problem in WinMe and WinXP is to use the System Restore function. Both versions of Windows periodically take snapshots of your system, including Registry settings, so you can restore your PC to a prior state. To do so, go to Start, then Programs, Accessories, System Tools, and System Restore. Check the Restore My Computer To An Earlier Time checkbox, click Next, and you will see a calendar of recent "restore points." These are the snapshots Windows has taken of your system state. Choose the date closest to but just before the installation or crash you think caused the problem; follow the prompts to restore the system.

You can use System Restore from Safe Mode. Even if Windows won't start normally, you can run System Restore if the PC will boot into Safe Mode. As your machine boots past the BIOS (Basic Input/Output) screen, hold down F8 and choose Safe Mode from the menu. Note that a system restoration may require that you reinstall some recently installed programs or hardware because the restored Registry and other system files may not be aware of their presence. Rest assured, however, that a system restoration does not send your *entire* PC back to a previous state. For instance, restoration does not delete recently created directories or data files, so your new documents or e-mail messages are safe. In fact, even recently installed programs

and driver files still will be on your system, although Windows may no longer know they are present.

■ **Meet ScanReg.** In Win98 and WinMe, the Windows Registry Checker (or ScanReg) is the OS' own way of maintaining a healthy Registry. However, users can also use the program to rescue a damaged Registry. There are two versions

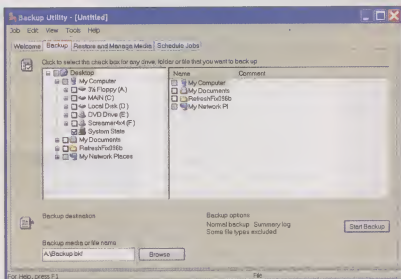
to complete the process of restoring a previous Registry. This will require a reboot to take effect.

If Windows won't even boot into Safe Mode, you will have to resort to using the DOS version of ScanReg. (Remember that WinXP has its own method of backing up and restoring the Registry. See below.) Although ScanReg applies to Win98 and WinMe, each

OS has a different way of getting to DOS. Under Win98, pressing F8 at the bootup screen will call up a menu that lets you start at a DOS command prompt. WinMe eliminates this option, so Me users will need to create a startup floppy diskette to boot into DOS. Either way, once at the C:\> prompt (your drive letter may be different), type `cd \windows` and press ENTER to change to the directory that contains Scanreg.exe. If you are fairly sure that a new software or hardware addition corrupted your Registry, then type `scanreg /autorun` to restore the previous day's Registry

backup or type `scanreg /restore` to call up a menu that will let you choose from among the past five backups. You can also have Win98/Me attempt to repair the registry automatically; in that case, type `scanreg /fix` and then press ENTER. (In all cases, note the space that appears after "scanreg" and just before the slash.)

■ **The XP Way.** The newest version of Windows does away with the ScanReg program but retains the System Restore function introduced in WinMe. The easiest way to back your way out of a corrupt Registry in WinXP is to use the System Restore option: Click Start, All Programs, Accessories, and System Tools. From the calendar of Restore Points, select a date that's (as best you can tell) just prior to the point at which your problem began.



The Windows XP Backup utility permits you to back up just the most essential System State files, including the Registry.

of the program. Scanregw.exe is the Windows version, which runs every time the OS starts. It makes a backup of the current, successfully loaded Registry; if it encounters serious errors in the Registry file, it will instruct you to reboot the computer and will load the DOS version of the program, Scanreg.exe, to try to fix the problem before restarting Windows. These Registry checkers make a backup of the Registry once a day and keep copies of the past five days' worth of backups.

If Windows will boot into or Safe Mode, you can, in Win98/Me, run the Windows version of the checker by calling up the Run command from the Start menu and typing `scanregw /restore`. A box will pop up listing five dated and time-stamped files. Highlight the file representing the most recent date that Windows booted and operated correctly and click OK

Backing It Up

Although the Registry Checker utility automatically makes a daily backup of the Registry in Windows 98 and Windows Me, it's a good idea to do this manually just before installing new hardware or software to your system. At the Run command line, type `scanregw` and press ENTER. You will be told that the system already made a backup today and asked to confirm that you want to make a new one. Click OK and you have a new backup.

In Windows XP, you can use the Backup Wizard to make regular backups of the computer's System State, a set of files that includes the Registry. Go into All Programs, Accessories, System Tools, and then Backup. Rather than click Next at the opening screen, look for the hyperlinked Advanced Mode text in the Wizard's window and click it to bring up an advanced version of the Backup utility. Click Backup Wizard (Advanced) to open the Wizard. Click Next to bring up an options screen that includes Only Back Up The System State Data. Check this option and follow the prompts, which will let you locate the backup on a floppy diskette or the hard drive. ☐

WinXP also introduces a new way to reinstall earlier, properly working registries. If you have been diligent about using the Backup utility to save your System State, WinXP makes it very easy to restore your computer to a working state. (See "No Going Back," beginning on page 110, for details about backing up your System State in WinXP.) Go to Start, All Programs, Accessories, and System Tools. Select Backup. Click the Next button, check the Restore Files And Settings option, and click Next again. If you have made backups of the computer's System State, which includes the Registry, you can highlight the backup you want to restore and follow the prompts.

■ Ounces Of Prevention. You can avoid some of the most common Registry corruption problems by following a few safe computing regimens. First, if at all possible, avoid premature or incomplete shutdowns. Some computer configurations are flawed and fail to close down the machine properly. If this is the case, you may need to reinstall Windows from scratch.

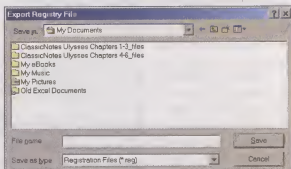
To install drivers, first uninstall them. New video and audio cards can cause Registry problems, because older drivers and resource links may have been left in the Registry by the previous card's installation. To minimize this risk, always fully *uninstall* the drivers for an old card before installing the new one. Click Start, Settings, and Control Panel. Use Add/Remove Programs to find and uninstall the drivers for the older device.

Whenever swapping in a new video card, or even upgrading the current card to newer drivers, it is always best to uninstall the current drivers and reset the Windows video mode to its default standard before installing new drivers. Start by uninstalling the drivers via the Add/Remove Programs program in the Control Panel. When you reboot, you will find that the video resolution and color depth are quite low. This means that Windows is using its default video mode and has properly uninstalled the previous version of the video drivers. From here, you should then install the new video drivers. You can also manually change the video card setting in the Display Properties box, which you call up from the Control Panel. Click on the Settings tab, the Advanced button, and then the Adaptor tab. If you see the specific brand and name of your current video card in this screen (such as NVIDIA GeForce3), the card's old video drivers are still being loaded by the Registry. To change this, click the Change button and select Specify The Location Of The Driver. In the next window, check the option for listing all of the available drivers, then choose one of the Standard video or VGA (Super Video Graphics Array) video drivers; follow the prompts to install it. Reboot and check the Adaptor tab in the Display Properties menu again to see that one of the Standard mode drivers was loaded. Now you are ready to load a new video driver into a cleaner Registry.

Know how to use the WinMe/XP System Restore function. In WinMe and WinXP, the System Restore feature can be your best friend when disaster strikes, so use it wisely. First of all, make sure that the feature is turned on. Click Start, then Control Panel. Select the System menu. Click the Performance tab and then the File System button. Under the Troubleshooting tab, make sure that the selection for Disable System Restore is cleared.

Generally, System Restore will create a Restore Point to which you can roll back every 24 hours of real-time or every 10 hours that your computer is on. You can also create a Restore Point manually at any time, and this is an especially good thing to do before you install new hardware or software that could create Registry problems. Call up the System Restore program (see above) and select Create A Restore Point. You will be asked to give the Restore Point a name. (A typical name might be descriptive, like "Just Before Installing XYZ video card.") From there, follow the prompts to complete the process. This will let you roll the system back to the state in which it existed just before the new installation.

■ Be Safe, Not Sorry. Of course, it goes without saying... Well, no, it doesn't: Registry tweekers need to take precautions before manually changing anything through the Registry Editor. If you are a more advanced user who likes to make these sorts of adjustments using the system's Regedit program, there is a very easy way to back yourself out of a botched tweak. Before



Before mucking about with any Registry keys, use Regedit's Export Registry File command to save the original state of the Registry key you are about to change.

making a change within any Registry key, you should make a backup of the existing key. Do this by highlighting the key in which you are making the change and calling up the Export Registry File command in the File menu. A menu will let you give the key a file name and location for the .REG file. If the Registry change you make creates problems, you can restore that key to its former state by going back into Regedit and using the Import Registry File command to import the (original) key you saved earlier. ☒

by Steve Smith

Deleting Programs

How Can I Miss You When You Won't Go Away?



Some software programs are like pesky relatives: no matter what you do, you can't get rid of them. We can't help you with your relatives, but we can let you in on a few secrets for getting rid of unwanted programs, which take up hard drive space, bloat the Windows Registry (an internal record of configuration information), and make routine maintenance more difficult.

Windows 98, Me, and XP include an Add/Remove Programs control panel (specifically named Add Or Remove Programs in WinXP) that can remove any program that includes an uninstaller utility. Most modern programs have an uninstaller utility, but there are exceptions, including some Microsoft offerings.

During installation, a destination is chosen for the software. The installer does more than move files to this destination. It also installs shared libraries, if needed, into various locations. And if the program needs background processes running while it works, the installer may put files into your Startup folder, to be launched when you boot your computer. The installer also makes additions to the Registry.

Common Uninstaller Problems. In order to properly uninstall a program, all of these system changes must be undone. Uninstallers usually work without a hitch, but sometimes they fail to perform correctly, leaving bits and pieces of a program behind. And sometimes they refuse to work at all.

Files and folders left behind. The most common error an uninstaller makes is leaving behind files, folders, and shortcuts. You can easily move these orphaned files to the Recycle Bin. They rarely cause problems, other than contributing to an untidy hard drive.

Shared libraries. Shared library files are pieces of code used by more than one application. An uninstaller may tell you that it's about to remove a shared library file that's not currently being used by any other application. Usually, it's safe to delete the file(s), but sometimes the uninstaller is mistaken, and removing the file will cause another application to become unstable or

fail completely. Reinstalling the affected application will restore the missing file. To avoid this possibility, choose not to remove shared files.

Application not listed. If a program doesn't include an uninstaller or doesn't make changes to the Registry, it may not show up in the Add/Remove Programs list. Open the Start menu, select Programs, and see if the program has an uninstaller listed. If so, run the uninstaller. If not, check the program's folder on your hard drive. If you still don't find an uninstaller, locate the program's install diskette or CD and run the installer again. Some installers include an uninstall option.

The last option is to manually delete the program by dragging its folder to the Recycle Bin. Check your Startup folder and remove any files or shortcuts related to the application. If the application created entries in the Registry to start processes at boot time, then the next time you boot, you may see an error message about files not being found. In most cases, you can ignore the message and carry on.

Listed application won't uninstall. Sometimes an application appears in the Add/Remove Programs list but generates an error message when you try to uninstall it. This can be caused either by manually removing the program and its uninstaller or by an uninstaller that's corrupt, missing, or in the wrong location.

One of the easiest ways to correct this problem is to reinstall the application to restore its uninstaller. You can then use Add/Remove Programs to uninstall the program.

Some applications in the Add/Remove Programs list can't be uninstalled. Examples include some Windows updates and MSN (The Microsoft Network) software.

Application is still listed after uninstalling it. An uninstalled application may still show up in the Add/Remove Programs list, usually because the uninstaller failed to remove a Registry key. You can manually remove this key by using the Registry Editor. Open the Start menu, click Run, and type `regedit` (in Win98/Me) or `regedit32` (in WinXP). A Windows Explorer-style window will open.

Before you start editing, back up the Registry file because making a mistake in the Registry has dire consequences. Go to Registry, Export Registry File (in Win98/Me) or File, Export (in WinXP). Select a location for the exported file and click Save. If you need to restore the Registry later, go to Registry, Import Registry (in Win98/Me) or File, Import (in WinXP).

In the left-hand pane of the Registry Editor window, burrow through the folders: `HKEY_LOCAL_MACHINE\SOFTWARE\MICROSOFT\WINDOWS\CURRENTVERSION\UNINSTALL`. Each folder listed under the Uninstall folder represents an application in the Currently Installed Programs list of the Add/Remove Programs control panel. The folder names may not match application names, but you can determine which is which by opening each folder and looking at the Display or Name key value. Once you locate the correct folder, right-click it and choose Delete. When you finish, go to Registry, Exit (in Win98/Me) or File, Exit (in WinXP).

Third-Party Uninstallers. These basic tips will help you deal with ill-mannered applications, but you may not feel comfortable trying some of them. After all, tracking down errant files can be a time-consuming headache, and working with the Registry is not for the faint of heart. Making a mistake in the Registry can cause severe problems and even corrupt Windows, requiring you to reinstall the OS.

To save yourself some aggravation, buy a third-party uninstaller. Two good choices are Symantec's Norton CleanSweep 2002 (\$29.95; <http://www.symantec.com>) and Business Logic's Ultra WinCleaner 2002 (\$29.95; <http://www.wincleaner.com>). Inexpensive third-party uninstallers can take care of most uninstall problems for you and make a great addition to your Windows maintenance toolkit. **LE**

by Tom Nelson and Mary O'Connor

Got Zip?

Reduce Big Problems With Compression Utilities



One of the great accomplishments of digital technology is that it lets us pack a lot of information into very tiny spaces. Entire libraries and vast museum collections, for instance, fit neatly inside a 3.5-inch hard drive. Customer databases that make metropolitan Yellow Pages look tiny can reside on a single CD. The data file that corresponds to this 1,600-word article consumes less space on a floppy diskette than the smallest letter on this page. And if that isn't small enough, there's always file compression.

All About File Compression. If size is a problem—and in the computer industry, it usually is—file compression is one of the answers. File compression refers to the process of condensing data so that it consumes less space. Users can then store these compressed files more efficiently on a hard drive or transmit them more quickly across a network. Unfortunately, compression

technology is still a mystery to many computer users, and that's where compression utilities come in.

A compression utility automates the process of compressing and decompressing (returning a compressed file to its uncompressed format) files for you. The compressed files reside in folders commonly called zip files or zip archives because most of them bear the .ZIP file extension, although other compression formats, such as .SIT and .TAR, are also available. You don't have to know how the compression utility is able to squeeze volumes of data into a single compressed file. All you have to know is that it can.

It's also important to note that computers treat all of the files and folders placed inside a zip archive as a single unit. Consequently, you cannot retrieve one of the compressed files without decompressing the entire zip archive. If you want to compress an individual file, you will have to create a separate zip archive just for it.

Fortunately, you have several compression utilities at your disposal. Users of Windows XP can take advantage of the OS' (operating system's) built-in Compressed (Zipped) Folder feature. Users of other OSes will have to rely on one of the third-party utilities, most notably PKZIP from PKWARE (\$26; <http://www.pkware.com>) and WinZip from WinZip Computing (\$29; <http://www.winzip.com>).

WinXP's Compressed (Zipped) Folder.

The Compressed (Zipped) Folder feature is new to Windows, and it's a particularly fine addition to the OS. Even so, Microsoft has done little to advertise the feature, so you may not be able to find it. You won't see it on the Start menu, and an icon on the Desktop doesn't represent it. Rather, you'll need to access it by right-clicking anywhere on the Desktop or within My Computer or Windows Explorer and selecting the New, Compressed (Zipped) Folder option from the context menu. As soon as you do so, a yellow folder with a zipper across it will appear on-screen. Type a name for the folder and press the ENTER key to save it. This is your zip archive.

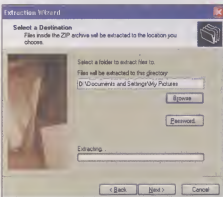
Compress a file or folder. At this point, the zip archive is empty and the utility hasn't compressed any files yet. All you have to do now is move the file or folder you want compressed to the zip archive. You can drag it there by positioning the on-screen pointer over the selected file or folder, pressing and holding down the left mouse button, sliding the file or folder over to the zip archive, and then letting go of the mouse button to drop the file or folder into the archive. Alternately, you can right-click the selected file or folder and select Copy from the pop-up menu. Then, right-click the archive and select Paste from its pop-up menu.

Either way, WinXP will compress the selected file(s) automatically. Note that if you choose to compress a folder, the Compressed (Zipped) Folder feature will compress any files contained within it. The folder itself, which is really an organizational construct Windows uses, remains unchanged.

Decompress a file or folder. Decompressing a compressed file or folder is easier than compressing it, thanks to WinXP's Compressed (Zipped) Folder feature. Simply locate the selected zip archive (you'll recognize it by its icon, a yellow folder with a zipper across it) on your system and right-click it. When the pop-up menu appears on-screen, you can select Open, Open With, or Extract All.

- **Open**—If you choose the Open command, WinXP will display the contents of the compressed folder in a new window. Double-click any of the files displayed to view a copy of the decompressed content. Note that you cannot edit the displayed content because the Open command does not fully decompress the file. To decompress it fully, you must use the Extract All command.
- **Open With**—The Open With command works just like the Open command, except that it gives you the option of selecting the program that you want to use for viewing the compressed file.
- **Extract All**—Use the Extract All command to decompress the zip archive and gain full access to its contents. After selecting the command, the Extraction Wizard will appear on-screen. Click the Next button to begin the process.

The first step in the process requires you to select a folder where you want to extract the contents of the compressed file. Type the location in the Files Will Be Extracted To This Directory field or click the Browse button to select a destination folder on your computer system. Click the Next button to begin the extraction. When extraction is complete, the Extraction Wizard will invite you to view the extracted files. Make sure the Show Extracted Files option has a check mark next to it, and then click the Finish button. The extracted and



Microsoft endowed its latest OS (operating system), Windows XP, with a built-in utility for compression. The Extraction Wizard, which is part of this utility, guides users through the process of decompressing zip archives.

fully decompressed files will appear in a window on-screen.

■ **Third-Party Utilities.** Keep in mind that WinXP (both Home and Professional Editions) is the first version of Windows to come with a

built-in compression feature, which means that users of Windows 98 and Windows Me must look elsewhere for compression functionality. We suggest PKZIP and WinZip due to their long and established histories of helping users compress files, but you could certainly check out other compression utilities, including WinRAR from ROG (\$29; <http://www.winrar-rog.com>) and Netzip Classic from Netzip (\$29.99; <http://www.netzip.com>).

You can purchase these programs on the Web, but we recommend downloading the free evaluation versions first so you can compare the programs. Indeed, the technical specifications for the latest compression utilities look a lot alike. Only after you begin to use the utilities do you see the differences among them. You can download the evaluation version of WinZip at <http://www.winzip.com/ddhomea.htm>. The evaluation version of PKZIP is available at <http://www.pkware.com/downloads/pkzipwind.html>. After the downloads are complete, install the utilities on your PC.

Compress files with PKZIP. PKZIP, developed by Phil Katz in 1989 (Katz also invented the ZIP format), set the standard for file compression. It remains one of the more popular software utilities in use today.

To compress files with PKZIP, you first need to create a zip archive. Click the New icon on the utility's toolbar, and then specify a name and location for the folder. After clicking the Save button, an Add Files dialog box will appear on-screen. Click its Advanced button. Now you're ready to identify the files you want to compress.

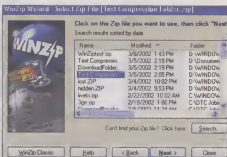
In the Select Files area of the dialog box, locate each of the files you want to compress and click the Add To List button (you can select multiple files by holding down the CTRL button while clicking the selected files). After you select all the files you want to compress, click the Compress button to complete the process.

Decompress files with PKZIP. Decompressing a zip archive with PKZIP is as easy as right-clicking the file and selecting the Open With, PKZIP For Windows option. When the utility opens, click the Extract icon on the toolbar. In the resulting dialog box, specify where you want to save the decompressed files, and then click the Extract button. Finally, click the Done button. That's all there is to it.

Compress files with WinZip. The latest release of WinZip ships with two interfaces: Wizard or Classic. We advise choosing the Wizard interface unless you're familiar

with the Classic interface used in earlier versions of WinZip.

To compress files with the WinZip Wizard, launch the Wizard interface and click the Next button to move past the information screen. On the following screen, choose the Create A New Zip File option and click Next. Here, you need to name the zip archive and specify a location for it. Type a name in the File Name field and click Browse to indicate where you want to save it (if you bypass the Browse button, WinZip will save your zip archives in the My Documents folder by default). Click Next to continue.



WinZip, one of several third-party compression utilities currently available, automatically locates zip archives on your hard drive and presents them in a list. To decompress one of them, simply select it from the list.

The third step is to click the Add Files button to select the files you want to compress. If you wish, you can compress folders by clicking the Add Folders button instead. Click the Zip Now button to complete the process.

Decompress files with WinZip. The WinZip Wizard also guides you through the process of decompressing your zip archive. Open the Wizard, select the Unzip Or Install From An Existing Zip File option, and click Next. On the following screen, locate and highlight the zip archive you want to decompress and click Next. Verify the name of the folder to which WinZip will extract the files, and then click the Unzip Now button to complete the process.

■ **Zip It Up.** Thanks to file compression, you can open any zip archive that comes your way. You also can send large files, including graphics and multimedia presentations, to other users without crashing their e-mail inboxes. Now if only someone would invent a way to shrink your workload... [E]

by Jeff Dodd

Nix The Indexing

Why Your Hard Drive Runs For Hours

Although you may not be familiar with Windows XP's Indexing Service, chances are, it has been quietly lurking in the background of your WinXP system consuming precious system resources to perform a valuable but relatively unknown function.

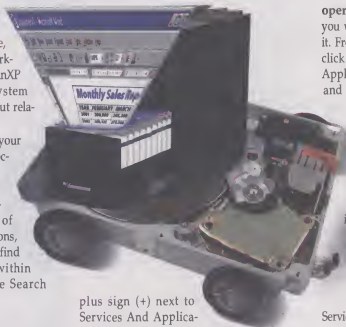
The Indexing Service searches your hard drive for specific types of documents (such as HTML [Hypertext Markup Language], text [TXT], and Microsoft Office documents) and creates a database of these documents and their locations, speeding up WinXP's ability to find certain files (as well as data within those files) when you use the Search Companion to search for them.

■ Define Its Importance. The Indexing Service utility might be useful for folks managing tons of data and documents, but few home users will probably use it, leaving it in the background to waste system resources.

The continuous searching and cataloging of the Indexing Service can potentially bog down a slower computer system and cause unnecessary wear and tear on your hard drive, depending on how your system has the utility configured. Computer users might even mistake spontaneous hard drive activity initiated by the Indexing Service as a virus or a cracker breaking into their system. If your computer's hard drive starts grinding away unexpectedly during a brief period of idleness, odds are it's WinXP's indexing utility going to work.

Disable the Indexing Service utility. Despite being difficult to find, the Indexing Service is easy to control. Click the Start button, select Settings, click Control Panel, double-click Administrative Tools, and then double-click the Computer Management icon. (You can also open Computer Management by right-clicking the My Computer icon on your Desktop and selecting Manage from the menu.)

Once the Computer Management window opens, click the



plus sign (+) next to Services And Applications in the left pane (called the console tree). Click Indexing Service to highlight it, open the Action menu, and then click Stop. Open the Action menu again, select All Tasks, and click Tune Performance. From the Indexing Service Usage dialog box, select the Never Used option, click OK, and then click Yes to confirm and disable the Indexing Service.

Fine-tune it instead. If you don't want to disable the Indexing Service but want to reduce the amount of resources required for it to operate, you can reduce how frequently it runs. Instead of selecting Never Used from the Indexing Service Usage dialog box, select Occasionally. Or, another alternative is to select Customize and click the Customize button to adjust slider bars that will increase or decrease the amount of system resources used by the Indexing Service.

Sliding the performance bars to the left decreases the performance of the Indexing

Service (but reduces the amount of system resources required to maintain it), while sliding the bars to the right improves searching and cataloging performance (at the expense of using more system resources).

Control how the Indexing Service operates. If the Indexing Service is something you want to use, here are some tips for using it. From the Computer Management window, click the plus sign (+) next to Services And Applications, double-click Indexing Service, and then double-click the System icon. Below the System icon are two folders:

Directories and Properties. There is also an HTML document labeled Query The Catalog.

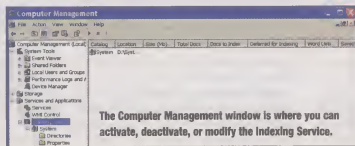
To disable the Indexing Service only for specific folders, double-click the Directories folder to view a list of folders in the right pane. Double-click a specific folder to open an Add Directory dialog box. Click the radio button next to No to disable the Indexing Service for the directory.

If you want to add folders for the Indexing Service to catalog, right-click the Directory folder, select New, then Directory. In the Path field at the top of the dialog box, type the path to the folder you want the Indexing Service to catalog. For example, if you have documents in a folder named Docs on your C: drive, type c:\docs. If you're unsure of the exact path to the folder you want to add, click the Browse button and browse to it. Click Yes to include the directory in the Indexing Service's searches, and then click OK to finish.

The Indexing Service can also catalog directories and files located on computers in a network. For example, if you have a small home network and share files between computers, type the path to the folder in the Path field using this format: \\computername\sharename. So, to catalog a shared My Documents folder on a computer named Bubba on your network, you need to type \\bubba\my documents in the Path field.

Most home users seldom need the Indexing Service and probably are better off just deactivating it and saving their computer's resources. However, if you frequently need to manage and/or search for numerous documents and sift through their contents, the Indexing Service can be a valuable tool. **ES**

by P. Bryan Edge-Salots



BEAUTIFUL. IN A NAILS FOR BREAKFAST KIND OF WAY.



— 2002 AVALANCHE*: Available now. —
The only vehicle that changes from an SUV to a pickup.
It adapts. But it never conforms.



— SILVERADO HD: Available now. —
Looks can be deceiving. But not in this case.



— 2002 TRAILBLAZER*: Available now. —
The *Toronto Star* said of our all-new midsize SUV,
"Whos, this changes everything."



— SSR*: Available early 2003! —
Truck *Trend* dubbed it "the Grand Poobah" of Cool.[™]
Sounds about right.

Once again, wearing a bowtie is a bold statement. chevy.com

CHEVY TRUCKS  LIKE A ROCK

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clean rooms—A closed-in area containing sensitive equipment. The air is filtered to keep out dust and other particles, and people wear protective clothing to avoid inadvertently contaminating the equipment. The computer facilities of many companies, particularly those with important data such as customer accounts, are set up as clean rooms, as are areas where highly sensitive equipment such as microprocessors are made.

Config.sys—A text file that specifies the drivers (software that lets computers communicate with hardware) and system parameters used in MS-DOS and OS/2. Config.sys controls some aspects of the OS' (operating system's) behavior, and it contains commands about how to do things such as work with new hardware or adjust memory. This file is read when the OS loads, and the instructions in the file are carried out by the OS loader. The file can be changed using any text editor.

driver—A program that lets a hardware peripheral, known as a device, communicate with a computer. Some device drivers, such as those for the monitor and keyboard, usually come with the computer, while others, such as those for a CD-ROM drive or a sound card, come packaged with their corresponding device. Device drivers, as well as updates for the device drivers, can also be obtained from the manufacturer of the component.

FAT (file allocation table)—The method MS-DOS uses to keep track of the contents of a disk. The table is a chart of numbers that correspond to cluster addresses on the disk. When users or programs request a file, DOS searches from address to address in the FAT to find where a file's clusters are stored on disk. It then goes to the disk to collect each cluster of information.

Fdisk—(Pronounced eff-disk.) A DOS command that starts the fixed disk configuration program. The program configures a hard drive for DOS use. It can be used to partition a hard disk into what the computer reads as multiple hard drives.

FTP (File Transfer Protocol)—A standard way to transfer files between computers. The method has built-in error checking. It is frequently used as a way of transferring many types of files over the Internet.

grounding strap—A conductive wire used to shunt unwanted electricity safely away from the computer. In computing, anyone physically touching components inside the computer's case, such as memory modules or the CPU, should wear a grounding strap on his or her wrist that is connected to a safe "ground." This will keep electrostatic energy in the person's body from damaging the delicate electronics.

heuristics—A method of problem solving that relies on trial and error, as opposed to algorithmic problem solving, which relies on static formulas and equations. Heuristic programs can learn; they develop common-sense rules for solving similar problems and then use them to solve the same type of problems in the future. Antivirus programs use algorithms to check for viruses, but if the virus doesn't match a known bug, the program won't detect it. Heuristic scanning, on the other hand, looks for suspicious code that the heuristic scanner has come to "know" resembles viral activity. Heuristic scanning methods are used primarily by those who are on the hunt for new viruses. They can set off too many alarms to be of use to regular users.

kernel—The main part of an operating system. The kernel handles the most basic, but most important tasks, such as managing the computer's resources, starting programs, and keeping time.

motherboard—The printed circuit board that is the foundation of a computer. This board contains a computer's CPU, RAM chips, and expansion slots. The motherboard is where all of the computer's components meet. Also called system board or mainboard.

OEM (original equipment manufacturer)—A company that produces fully manufactured computers and adds hardware, software, and its name to a product. The OEM then sells the system as its own.

patches—A piece of code inserted into software to temporarily fix a defect. Although most users do not consider a patch a shortcut or a shabby way to fix a problem, adding too many can make a program difficult to maintain. Programmers often create patches to fix problems and add features to a program during the timeframe when users are awaiting the release of a new version of the program that already includes the "patched" corrections and new features.

Recovery Console—In Windows XP, a utility that assists users by providing administrative commands that might be useful in repairing a computer.

SMTP (Simple Mail Transport Protocol)—A communications protocol that directs e-mail exchange on TCP/IP (Transmission Control Protocol/Internet Protocol) networks.

VxD (virtual device driver)—Virtual device drivers act as a simulation buffer between applications and hardware. The drivers sort out and ensure that the correct application gets the information. With this setup, multiple applications can access the same hardware without causing conflict. In a device file name, V means virtual and D means device. The middle character(s) further define the device driver; for example, VmD represents a mouse driver.

warez—Pronounced "wares," a term for copyrighted software made available illegally for downloading from the Internet. Also, any method used by software pirates to acquire applications without paying for them.

Windows Registry—A database that contains information about user preferences and system configuration in Windows 95 and later. The Registry contains information about which devices are attached to the computer and which drivers should be used with them. It also keeps track of file associations (which programs should be used to open which type of files) and user preferences, such as what the monitor resolution and Desktop pattern should be. The Registry is contained in the System data and User.data files. Changes to the Registry are generally made through the Control Panel, not by users directly editing the Registry. To manually edit the Registry, the Regedit utility can be used. Extreme caution is advised when manually editing the Registry because errors in it can disable Windows and prevent the machine from booting.

Zip drive—A popular type of media storage drive made by Imega. Zip drives can be installed either internally or externally, and several interfaces, such as SCSI (Small Computer System Interface), ATAPI (Advanced Technology Attachment Packet Interface), and USB (Universal Serial Bus), are available. Zip drives use Zip disk media, which look somewhat like standard diskettes.

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